



**GENERAL RURAL HEALTH SURVEY,  
SINGUR HEALTH CENTRE, 1944.**

**BY**

**R. B. LAL, M.B.B.S., D.P.H., D.T. M. & H., D.B., F.N.I.**

AND

**S. C. SEAL, M.B., D.P.H., F.A.P.H.A.**



(From the section of Epidemiology and Vital Statistics, All-India  
Institute of Hygiene and Public Health, Calcutta.)

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## INTRODUCTION.

A 100 years ago William Farr, the great British Epidemiologist stated in his first official report that "diseases are more easily prevented than cured and the first step in their prevention is the discovery of their existing causes". He originated and demonstrated practical methods of how to discover "the existing causes" by mathematical analysis and proper interpretation of carefully recorded facts. Since then not only the statistical technique has greatly advanced but great strides have been made by science to wrest from Nature Her secrets regarding the biological causes of diseases. Thus the advancement in our knowledge has not decreased but further increased the need of careful recording of facts because of the greater possibilities now of achieving the objects which Farr had in mind. However, while theoretically subscribing to the view that sound public health administration must rest upon the solid foundation of properly digested factual data, the authorities all over the world have, with few recent exceptions, failed to implement Farr's recommendations. They have been content to draw upon routine statistics, originally designed for political and general administrative purposes. These may be divided into two main groups, namely (1) continuous recording of concurrent events and (2) periodical collection of special information. Both methods are employed at the same time in most civilised countries.

Of the former group the health workers draw largely upon the birth and death registers, hospital and dispensary figures, records of maternity and child welfare centres, meteorological observations, economic statistics and other material derived from diverse sources. Of the statistics collected periodically they depend mainly on decennial census reports. The data provided by the routine statistics of either description are of some value in giving a crude and hazy outline of the health conditions of a community, but they obviously have their limitations, for reasons into which it is not necessary to digress here, except to mention the fact that they are inadequate if anything like a useful health picture is to be drawn. This is particularly so in our country where statistical material is notoriously poor both in quantity and quality. To remedy this deficiency special surveys have oftentimes been instituted such as malaria surveys, tuberculosis surveys, leprosy surveys, diet surveys and so on. These surveys when properly carried out have yielded very useful information and have sometimes helped to shape the public health policy. It may, however, be said that they have been conceived from a restricted point of view by persons technically specialising in particular branches of medicine. Under the circumstances there is a certain amount of danger of the formulation of an unbalanced public health programme. Besides, if a survey, for a particular disease, is to be really of value, one must go into a variety of environmental and socio-economic factors, most of which are of common interest to workers in diverse fields. Hence these specialised surveys must necessarily involve a considerable amount of reduplication and thereby unnecessary expenditure of public funds and efforts besides being a source of irritation to the people due to repeated visits by different workers. In view of these considerations schemes of general health surveys have found

favour in recent years. For instance, before the outbreak of the war the Health Organisation of the League of Nations and the Milbank Memorial Fund financed the schemes for the development of an International System of Health Indices. Stouman and Falk (1937, 1938) have produced excellent report on a Hungarian village and on a Belgian town. Admirable as these reports are their general plan is unsuitable for Indian conditions, and there is insufficient attempt to integrate the findings. It may be mentioned here that the idea of general health surveys has been developing in the United States of America for a considerable time, and the long and arduous task of producing the Rural and the Urban Appraisal Forms which are in many ways akin to general health surveys, does credit to the pioneering spirit and forethought of the leading public health men of that country. Over a period of 20 years the U. S. A. Public Health Service had been carrying out a number of surveys of relatively small-sized communities and had developed the techniques and procedures of conducting surveys for sickness and related socio-economic factors. In 1935-36 they conducted a National Health Survey in a big way which is a pointer to the future basis of public health administration and tacit recognition of Farr's recommendations. They enquired into 700,000 households in urban communities in 18 States and with 37,000 households in rural areas in 3 States.

Since 1937 one of us (R.B.L.) has introduced a short programme of general rural health survey in the D.P.H. course with considerable benefit to the would be health officers, and in course of years he has developed a set of schedules and general methodology of the survey with the help and assistance of his colleagues in the Institute.

In 1944 when the Singur Health Centre was reorganised, a general health survey was instituted on the lines mentioned above with the following objects :—

- (1) To obtain an integrated picture of the health conditions of the population, and of some of the factors likely to influence the state of community health.
- (2) To crystallise the main health problems of the community and to determine if possible their relative importance, thus helping in the formation of a progressive and well balanced public health policy for better health protection and health building.
- (3) To serve as the base for assessing the extent of progress that might be achieved as a result of specific health measures by carrying out periodical surveys of special types, and
- (4) To collect material and obtain a deeper appreciation of the health problems for purposes of teaching.

The present survey, it may be freely admitted, is partly in the nature of an experiment because one of the objects was to evolve a complete scheme of general health survey for use in different parts of the country with such modifications as local conditions may warrant. Through this experience we have discovered certain weaknesses in our scheme which arose partly from war emergency and partly from insufficiency of supervisory staff. A larger area and a bigger sample would permit more detailed analysis. We hope that these short-comings would be removed in future surveys. From what has

been stated above, it will be apparent that a survey is not merely a routine investigation but it is a piece of research, and as such, the analysis and interpretation of the data collected in the course of field work needs considerable time for sifting, analysis and interpretation.

It may be mentioned here that of the 4 Unions which now constitute the Singur Health Centre, viz., Singur, Balarambati, Bora and Begumpur, the first two formed a part of the Singur Health Unit which had been in existence for a period of 5 years previous to the commencement of the survey, while the last two have been included in the Centre for the first time. The principal innovation in the reorganisation scheme is the combination of the medical and public health activities under a single administration. An outline of the scheme will be found in Appendix I, but it may be mentioned that being the practice field of the Institute the details of the scheme have been and are subject to continuous changes, besides the Centre has the benefit of constant advice and supervision by the members of the professorial staff and of frequent visits and encouragement by highly placed officials and non-officials both Indian and foreign. It has also had the advantage of financial assistance from various funds for a number of supplementary schemes which are in operation. Another point which needs mention here is the fact that the period of survey unfortunately coincided with the time of unusual stress and strain to which the province had been exposed. When these are removed there will be an automatic trend towards partial or complete recovery of the general health conditions irrespective of specific health measures practised. These circumstances must be borne in mind when viewing the present picture of community health and in assessment of the progress made in the near future. The general scheme of the investigation may be summarised as follows :—

- (1) To draw a theoretically sound sample of the population.
- (2) To investigate all individuals included in the sample with regard to their biological and social characteristics, anthropometric measurements, state of health and disabilities at the time of investigation and during the past 12 months supported by rapid clinical and laboratory examinations with special reference to nutritional assessment.
- (3) To reinforce the general investigation of the individuals with special investigations for married women, infants, pre-school children, school children and pregnant women.
- (4) A more thorough investigation of sick people for arriving at a diagnosis, and of special investigations of the circumstances in which the cases of notifiable diseases arise.
- (5) Investigation of families with regard to socio-economic and biological characteristics.
- (6) Sanitary assessment of houses.
- (7) Investigation of villages for describing the environmental conditions and special organisations with particular reference to schools, hospitals and other corporate activities.
- (8) Dietetic and malaria surveys.

Before making a detailed study of the report the reader might find it convenient to glance through the 'General Remarks' and perhaps also the 'Summary and Discussion' given at the end.

## CHAPTER I.

## METHODS AND ORGANISATION.

## General considerations.

The families selected through the sampling technique described below were visited by investigating parties consisting of a medical man and a sanitary inspector or a health visitor, and every effort was made to contact each member of the family personally. This necessitated repeated visits due to the temporary absence of some of the members at the time. This point has been specially mentioned because the persons designated as absentees were those who were away and could not be contacted during the period when the investigator was working in the village or near-about.

The investigation consisted of recording histories of individuals and of a limited amount of physical examination on general individual schedule of which a special clinical card for nutrition assessment formed a part. Collection of certain clinical material for laboratory investigation was carried out, at the same time, for a sub-sample of the population. Special information concerning married women, pregnant women, infants, pre-school children, school children and patients were recorded on appropriate addenda of the general individual schedule or on special appropriate schedules. In cases of infectious patients special investigation of the family was carried out and records were made in the Home Visiting Schedule. Besides these, family schedules were used to collect information common to the members of the family group which included cultural and economic assessment. Since, the economic section of the family schedule was time-consuming the number of families for this purpose was restricted, as will be mentioned under the technique of sampling. This is also true of diet survey by diary method which was carried out for 7 consecutive days for a limited number of families. Similarly, for sanitary assessment of the houses a sub-sample was drawn. Included amongst the environmental investigations was a special survey for mosquito breeding and mosquito harbouring. It may be mentioned here that except in the case of patient's schedule, the object of which was to elicit diagnosis, and the home visiting schedule for infectious cases the data were obtained on schedules specially designed for automatic classification and mechanical analysis by means of Power Samas punching and sorting machines. The laboratory examinations were carried out by the branch laboratory of the Institute located at Singur, where fresh specimens were sent by messenger. In case of more complicated examinations, facilities were available at the main laboratory of the Institute in Calcutta.

The scheme which commenced operations on the second January 1944 originally provided for 6 investigating parties to be distributed in suitable centres to cover their respective areas within 3 months for work involving medical skill. The environmental studies were to be completed during the next 3 months before the rains came. This plan could not be worked because of the difficulties experienced in the recruitment of the staff. In spite of the increased rates of salaries offered due to the war emergency, no suitable medical graduates were available in time for their training which had to be carried out hastily and rather unsatisfactorily. At the commencement of the survey heavy teaching work and other responsibilities of the Professor who

was the only medical personnel in the Section, at the time, prevented him from giving undivided attention to the field workers. To facilitate supervision a modification of the original plan had to be made whereby the investigating parties were located close together and were moved on continuously as the survey proceeded, instead of being distributed simultaneously over all the area. It may be mentioned that although there were standing instructions, and each schedule was provided with a self-explanatory key, it was found necessary to give personal instructions repeatedly in the field and to solve many little difficulties which the workers encountered. As a result of this experience it is our conviction that regular surveys should be preceded by a special training for the workers which should extend for at least 2 months. The people were generally cooperative but the war time emergency created considerable difficulties in procuring suitable accommodation for the workers in the villages as also their food rations. Though it may appear to be a minor point, the difficulty in obtaining the services of sweepers for collecting and carrying stools for examination were almost insurmountable. In future, surveyors would do well if they bear these points in mind.

The schedules were filled in duplicate and a bi-weekly contact was maintained with each party through messengers who brought up copies of filled schedules to the Head Quarters, where they were edited. They carried back the enquiry slips for rectification of mistakes of omission and commission. Field checking for correctness of entries was also carried out as extensively as possible to ensure accuracy. Regular weekly records of the future programme of each worker, of the extent to which the programme had been carried out and of the excess or deficiency as compared with allotted work, were regularly maintained and checked. It may be stated that on an average 1,800 population was investigated by each party in the course of six months. This of course includes the linked up clinical examinations, family investigation and environmental studies. It is not intended to discuss each item of the various schedules and addenda because, they are provided with self-explanatory keys and instructions to which reference may be made (see Appendix II). However, short notes on a few points may be of value.

### The Schedules.

*The General Individual Schedule:* It will be noticed that residential status has been divided into six classes; three for those present at the time of investigation and three for the absentees. In either case the basis of classification is habitual, adopted and temporary residence. Although in the present case the actual numbers in Groups II and IV are small, it is held that the classification is of fundamental importance in deciding the allocation of births, deaths and sickness more intelligently than would be otherwise possible. This is so, because a mere mechanical transference of events to the places of habitual residence is not always correct, inasmuch as it is desired to assess the local factors actually influencing the incidence of those events. For instance, it would be unjust to transfer the death of a man to the place of his habitual residence if it has been caused by an accident occurring in a workshop outside, where he was temporarily residing. The divisions of age have been made on broad quinquennial grouping, as well as in terms of individual years, and for infants, for part of the year, because while the broad divisions would suffice for ordinary purposes and correspond with the census classification, small divisions would be available for closer studies as and when desired.



The definition of wage earner is broad-based to include potential wage earners, because thereby the causes of unemployment with special reference to sickness and disability can be studied and discussed. With regard to sickness we have two pictures—one, a cross-section of morbidity conditions at the time of investigation, and the other, the history of sickness during the previous 12 months. These morbidity data can be correlated with or studied against the back-ground of a large variety of circumstances for which information is provided in the General Individual Schedule and the Addenda. By this means it should be possible to discover the relative importance of many factors—social and biological which have hitherto been merely assumed as of importance in the evolution of community health and disease, provided the data are sufficiently large. The chart given at the end of the General Individual Schedule was devised with a view to locate, as nearly as possible, the exact date and duration of sickness by helping the memory in reference to important social events in the Bengalee Almanac for the year under discussion.

*Addendum for Nutritional Assessment:* It was originally designed by Sankaran (1940) for a simple scoring method. However, it was felt that the mere addition of the marks given against each item to denote the degree of clinical condition would lead to spurious results. A careful clinical study of each individual has, therefore, been made on the basis of entries in the nutritional assessment card and the conclusions are based on clinical judgment rather than on mechanical addition of the score. To facilitate this a key has been provided.

*Schedule for Absentees (including dead):* This special General Individual Schedule has been provided for the Groups II, IV and VI representing respectively the habitual residents of the village normally residing there though temporarily absent, habitual residents of the village temporarily living elsewhere and absent at the time and temporary visitors who came to the village and had gone away before the date of investigation. An addendum has been added for those who died during the year.

*Addendum concerning Married Woman and Pregnant Woman:* No comments are required on the addendum concerning married women, but it would be evident that given sufficient data, information could be obtained for important points concerning the life of the married woman. The same remarks apply to the addendum for pregnant women.

*Addendum concerning Infants, Pre-school and School-age Children:* The high incidence of infant deaths merits a special consideration of children under 1 year. Even though it may not be possible to assess the influence of the various factors, noted therein, on infant morbidity or mortality, it is believed, that a considerable amount of information regarding child life will be obtained which is hitherto not available for general population. The same remarks apply to the pre-school and school-age children, both of whom have special problems of their own. A special feature of the addendum for the school-child is the information about health knowledge and routine health practices and it is hoped that a decided improvement in these respects will be observed after the introduction of school health education programme. A direct assessment of this programme is also provided in the item relating to participation in health practices.

*Patient's Schedule :* Patient's schedule provides a check on hasty diagnosis of the present sickness by the surveyor. A list of disease nomenclature has been provided for purposes of codification. The nomenclature is based on the International List of Causes of Death. Due regard has been paid to the inclusion of those specific conditions which are expected to be present, the sub-division has been limited to the extent to which diagnosis is possible in a survey like this. Corresponding numbers of the International List have been given against each item. However, the order has been changed into alphabetical arrangement to facilitate reference to the code during the survey.

*Home Visiting Schedule for Infectious Diseases :* Infectious Disease Schedule is intended to help in arriving at and checking the epidemiological diagnosis.

*Family Schedule :* Just as in respect of some items the individual is the unit of observation, so also in respect of others the family as a whole is the unit of description. Certain vital events have been included in the Family Schedule to provide a check on some information obtained elsewhere. It also supplements information not available through the General Individual Schedule or Addenda, as for instance the information about births for Groups I and II occurring outside the village. It may be somewhat ambitious to arrive at a judgment of the family culture, but difficult as it is, its importance cannot be ignored, and an attempt, if only a crude one, has been made to ascertain the outlook of the family and its expression in social relationship.

*Economic Schedule :* The Economic Schedule has been specially designed to obtain such information as may be of interest to the health worker. As regards the expenditure a division has been made with expenditure on consumption and expenditure on production. The former has been sub-divided with regard to the food and the other expenses of consumption. It is but natural that the relative proportion of expenses on the consumption side of food and other items will vary from community to community, and possibly a more detailed information may be necessary on other expenses than food, in more organised communities.

*Sanitary Assessment of Houses :* In the Sanitary Survey of Houses a quantitative estimation of the sanitary conditions inside and outside the house has been attempted and it is hoped that a fairly good picture of the environmental conditions under which the people live will emerge.

*Village Schedule :* An additional schedule to study the environmental and socio-economic conditions for the village as a whole has been designed, but for lack of time it has not been filled except in part relating to the breeding places of the anopheline mosquito and the harbourage of the adults.

*School Sanitary and Medical Investigation Schedules :* A survey of the schools and medical examinations of the school children was also intended to be carried out, but this part of the work having been conducted by Public Health Organisation, was not repeated. Their findings are given in Chapter X.

*Diet Survey Schedule :* A diet survey of 30 families by the diary method has been carried out. It is recognised that both the number of families investigated and the period of investigation is inadequate for the purpose, specially because considerable variation in the diet takes place in different

parts of the year. The problem is difficult because this kind of survey is time consuming and has to be carried out throughout the year. However, a limited information obtained here may be found of some use as a correlated study of the general survey.

### Laboratory Methods.

*Stool Collection*: Collection of stools presents special difficulties, because the people evacuate themselves in open fields wherever the slightest privacy can be secured such as by hedges or by trees. To obtain identified specimens each individual was provided with a red flag to which he or she was requested to tie an envelope which contained certain particulars for the individual. They were requested to plant these flags beside the stools passed by them in the morning. The stools were picked up in faeces collection tubes which consisted of a spoon attached to a cork which could fit a glass tube. A metallic cover was provided to protect the glass tube during transmission. The envelope was removed from the flag and attached to the faeces tube in which the stools from the particular individual were collected. These tubes were despatched to the Field Laboratory where the samples were subjected to microscopic examination within 4 hours. The stools were examined by Barber's salt solution flotation method for eggs of helminths; and by ordinary saline suspension and the iodine staining method for intestinal protozoa and cysts.

*Blood Examination*: Both thick and thin films were examined for blood parasites. Haemoglobin was roughly estimated by Takquist's haemoglobino-meter.

### Sampling.

The object of a sample survey, in the words of R. A. Fisher is "to give the maximum precision in return for the labour expended". Statistical theory provides formulae by which accuracy of a sample of a given size obtained by a given method can be worked out. These formulae involve characteristics of the population. Actually these characteristics are not known, and in fact, are the ones required to be determined through the survey; if they were known the problem would not arise. In many practical situations previous experience will give a fair estimate of these characteristics, and it may be justifiable to use these estimates in appropriate formula for the purpose.

For the same sized sample the accuracy may vary according to the method of sampling employed. For example, a stratified sample of a given size may more accurately provide the estimates of the characteristics of the population than a completely random sample. To use the method of stratified sample, however, it is necessary to know the appropriate classification into which the population should be divided in respect of a particular characteristic, and also to have a pre-knowledge of the variation between the elements of each stratum. A preliminary survey may provide such information, or in its absence certain common sense classification and estimates of variation mentioned above may be used as the best approximation. However, since we are concerned with a large number of variables or characteristics, and it is obviously not possible nor desirable to change the sample size in respect of each characteristic, a stratified sample for overall purposes cannot be obtained,

for, while it may be good for one characteristic it may be very wrong for another. Hence, in a problem like the general health survey we cannot use the stratified sampling technique and have to depend upon a completely random sample.

In considering a population we are confronted with various units of description. For instance, in the present case we have a number of possible units such as the individual village, the individual family or the individual person. Which of these units of descriptions should form the basis for sampling? The obvious answer, perhaps, would be to select such unit of description as would form the ultimate basis of discussion. It may be readily agreed that in most of our discussions the unit of description is the individual, as the rates commonly used relate to the population of the individuals; but for some purposes, the family, the house or the village may form a more appropriate unit of description. For example, in the study of economic conditions the family unit is more appropriate than the individual unit. In the discussion of sanitary condition the house unit provides a better basis and so on. Here again, we are confronted with difficulties of the same nature as mentioned in the case of stratified sample. However, the assumption made above, *viz.*, that the unit of description in which we are primarily interested should necessarily be used for sampling to obtain best accuracy is not always correct. For instance, granting that our ultimate object is to base our observations on individuals, and that the size of the sample (individuals) remains fixed a sampling scheme in which the family is taken as the unit may sometimes lead to a greater and sometimes to a lesser degree of accuracy, as compared with a scheme in which the individual forms the unit. It all depends upon the degree of intra-familial correlation with regard to the particular characteristic under examination. In case it is positive the accuracy of the estimate where family has been taken as the unit will be inferior to the one obtained by taking individual as the unit and *vice versa* if it is negative. Since the variety of information to be collected in a general health survey is large, the selection of one or the other scheme will give higher accuracy for some characteristics and lesser accuracy for the others. For practical considerations of field work such as undesirability of discrimination within the members of the family which may sometimes lead to awkward situations, and also for the fact that in certain epidemiological and socio-economic considerations a complete picture of the family is necessary, we have adopted the family as the unit for purposes of sampling. It may be stated here that the loss of accuracy in estimates arising from high intra-familial correlations can, if necessary, be assessed by using the intra-familial correlations with regard to any characteristic in the general formula of standard deviation of the sample. The formula just mentioned is as follows :

$$S.D. = \sqrt{\frac{M-m}{M-1} \frac{PQ}{mN} \left\{ 1 + R (N-1) \right\}}$$

where 'M' is the total number of families in the population, 'm' is the number of families selected in the sample, 'N' is the average number of individuals in the family, 'R' is the intra-familial correlation with regard to the given characteristic and 'P' is the true value of the proportion in the population. From this general formula the following simple formula may be derived

when we ignore the problem arising out of intra-familial correlation and take individual as the unit.

$$S.D. = \sqrt{\frac{PQ (N-n)}{n(N-1)}}$$

where 'N' is the total population, 'n' is the number of individuals in the sample and 'P' is the true value of the proportion in the population.

It will be readily seen that the ratio of standard error to 'P' will vary according to values of 'P' and of 'N' for the same size of 'n', and these may change with various characteristics. We know that 'P' varies independently for different characteristics and that 'N' may also change at the same time. The true value of 'P' is not known, but as we have said before we may take a common sense value for approximation. To illustrate this point let us take two characteristics—(1) maternal mortality rate and (2) crude death rate. We may use for purposes of illustration the value of 'P' for India as a whole. For maternal mortality rate 'P' is approximately 0.02 and for crude death rate it is 0.025. 'N' for the former characteristics is the number of total births and for the latter characteristic the whole population. For the same sized sample 'n' the ratio of the standard error to 'P' will be obviously higher for maternal mortality rate than for the crude death rate. Or, in other words, the estimate of maternal mortality rate of the population will be less accurate than for the crude death rate. If it is desired to obtain the same degree of accuracy for the estimates of various characteristics we may resort to the multi-stage method of determining the size of the sample, that is to say, a large sample may be taken for purposes of determining the 'P' for certain characteristics, in which the accuracy will suffer with smaller sized sample, and to take sub-samples for characteristics in which smaller sized samples will give the desired degree of accuracy for the estimates. To go back to our illustration we may require a large sized sample for determining the maternal mortality rate and a small sized sample for estimating the crude death rate. This is obviously too complicated a procedure to be practicable for general use. However, for special purposes the technique of sub-sampling has been adopted as will be mentioned later.

The population under investigation was 62,700, or say 60,000 for purposes of simplicity. If we take 1/6th of the population, i.e., a sample of 10,000—then for any characteristic in which the value of 'P' is 5 per 1,000, the range of estimated value will lie between 3.7 per 1,000 to 6.3 per 1,000 (at 5 per cent. level). Similarly, if for any characteristic the population sub-group was reduced to 4000 and the 'P' was 5 per cent. then the range for the estimated values will be 4.4 per cent. to 5.6 per cent. This amount of accuracy was considered adequate and originally a sample of one-sixth of the total population (10,000) was adopted. The number of families to be taken was determined by dividing the above number by average number of individuals in a family. The following scheme of sub-sample for special purposes was adopted because of the practical difficulties and also because it was considered that in these cases the standard error will be generally low. Sub-samples for blood and stool examinations consisted of 60 per cent., economic survey and sanitary assessment of houses 50 per cent. each and diet survey 5 per cent. of the sampled families. The sub-samples were carried out in series, so that the

families selected for diet survey will necessarily be included in the families selected for economic survey and sanitary assessment and so on. However, for reasons stated previously these targets were not reached. Table I gives the statement of the actual number of families investigated for various purposes together with the standard deviation for one appropriate rate or value of a suitable characteristic.

TABLE I.

*The sizes of the Main Samples and the Sub-samples with Standard Deviations for Appropriate Rates or Values of a Suitable Characteristic.*

Nature of sample.	No. of units investigated.	Proportion of units in the sample to the units in population.	Common sense rate or value of a characteristic in the population.	Standard error of estimate of the rate
Main sample . . .	1,197 families (6,551 individuals).	1/10th approx.	0.005	0.0003
Blood examination . . .	5,438 persons .	1/11th "	0.03 (Blood parasite)	0.002
Stool examination . . .	2,199 persons .	1/28th "	0.4 (Stool parasite)	0.010
Sanitary assessment . . .	580 families .	1/20th* "	0.2 (Cleanliness)	0.161
Economic survey . . .	512 families .	1/22nd "	Rs. 150 (mean expenditure per capita on consumption with S. D. of Rs. 50).	2.2
Diet survey . . .	30 families .	1/40th "	2,400 ± 200 (calories consumed).	36.5

\* Since in some houses more than one family reside the proportion of the houses included in the sub-sample to the total number of houses (which are estimated at 8,300 approximately) is 1/14th. On this basis the S. D. for cleanliness would be 0.0159.

It will be seen that at 5 per cent. level the estimated values have a fairly reasonable accuracy under the assumptions made above.

*Procedure for the selection of families.*—Of the 4 Union Boards, Singur and Balarambati were included in the original Singur Health Unit Scheme. For these Union Boards a list of villages and of the families in each village were available. For Bora Union Board similar lists were supplied by the President but they did not contain information about the sex. For the Begumpur Union Board no such lists were available and they had to be prepared by a preliminary survey. Each family was numbered serially for the whole area and selections for the main sample and for the sub-samples were made with the help of Tippett's random numbers. Before commencing the actual survey operations, the families so selected were identified in the field and each was prominently marked to indicate whether it was included in the main sample only, or it was also included in any of the sub-samples. At the same time, preliminary information about these families were obtained in respect of certain items namely the number of infants, pre-school children, school-age population, adults by sexes and pregnant women, as also a rough estimate of the family income. It may be mentioned here that it was not found practicable to evenly spread out the sample throughout the 4 Union Boards. While in Singur and Balarambati Unions the sampling numbers were kept up to schedules, in Bora and Begumpur Unions only alternate families in the sample were examined. The statement of the target number of families and the number actually investigated is shown in Table II.

TABLE II.

*Comparison by Union Boards of the Sizes of Target Samples and Sub-samples with those actually Surveyed.*

	SINGUR.		BALARAMBATI.		DORA.		BHOUMPUR.		TOTAL.	
	Target.	Actually done.	Target.	Actually done.	Target.	Actually done.	Target.	Actually done.	Target.	Actually done.
Main sample . . .	352	307	403	310	457	103	098	357	1,010	1,176
Sanitary assessment . .	170	152	201	141	228	77	340	210	051	580
Economic survey . . .	170	130	201	110	228	01	340	160	051	512
Diet survey . . .	17	3	20	12	22	5	35	10	04	30

NOTE.—Investigation of twenty-one other families has been carried out but family cards were not filled, as most of the families were absent at the time of survey and hence ab-anteo schedules only could be filled.

As has already been stated, we have used completely random samples and not stratified samples. Since, it is well known that many characteristics of a population are influenced by its general biological constitution such as age and sex, the actual values of those characteristics may be vitiated if the sample did not correspond with the population in respect of age and sex. In other words, the value of a given characteristic derived from a sampled population may partly deviate from the true value of the characteristic of the population, because of disproportionate sampling as regards the age and sex. This point is capable of being tested, and a comparison between the sample and the total population has been carried out in respect of sex and size of family for Singur and Balarambati Unions for those villages for which the data were available. [See Tables III, IV(a) and IV(b)].

TABLE III.

*Comparison of the Sex Proportion for the Population and the Sample.*

	SINGUR.			BALARAMBATI.		
	Male.	Female.	Total.	Male.	Female.	Total.
Sample . . . . .	035	007	1,242	701	707	1,408
Population . . . . .	3,717	3,255	0,072	4,380	3,022	8,302

$\chi^2=2.0$  not significant.

$\chi^2=0.6$  not significant.

TABLE IV(a).

*Comparison of the Family Size of the Population and of the Sample.*

	Family size (Singur Union).												
	1	2	3	4	5	6	7	8	9	10 & 11	12-15	16+	Total.
Sample . . . . .	15	26	44	25	80	21	34	18	14	13	5	5	230
Population . . . . .	99	151	100	215	185	153	122	106	62	52	30	27	2,367

$\chi^2=23.0$  (Significant)

TABLE IV(b).

	Family size (Balarambati Union).												
	1	2	3	4	5	6	7	8	9	10 & 11	12—15	16+	Total.
Sample . .	15	30	37	41	32	20	22	12	18	9	15	3	254
Population .	98	170	223	234	226	183	121	84	65	58	63	39	1,570

$\chi^2 = 10.6$  not significant.

Unfortunately we have no data for the population in regard to sex and size of the families for Bora and Begumpur (where smaller sized samples have been taken) and for any of the four Unions in respect of age distribution, and therefore, the comparisons cannot be made. However, from whatever material is available one may have a fair degree of confidence that gross imbalance as regards the main biological characteristics has not arisen through random sampling.



## CHAPTER II.

## TOPOGRAPHY, PHYSIOGRAPHY AND OTHER ENVIRONMENTAL CONDITIONS.

## Location.

The Singur Health Centre consists of four contiguous Unions namely Singur, Balarambati, Bora and Begumpur situated in the Serampore Sub-division of the Hooghly District, Bengal. It lies just south of Tropic of Cancer between  $22^{\circ} 35''$  and  $22^{\circ} 55''$  N. and  $88^{\circ} 10''$  to  $88^{\circ} 20''$  E. It is bounded on the north by the Unions of Anandanagar and Gopalnagar, on the west by Haripal and Janai Unions, on the south by Chanditala and Monoharpur Unions and on the east by Nasibpur Union and *thana* Serampore. The Unions of Singur, Balarambati and Bora are within the jurisdiction of the Singur Police Station and that of Begumpur is included in Chanditala *thana*. At Bora there is a police outpost. Singur and Balarambati form the northern half and Bora and Begumpur the southern half of the area (*vide* Map I).

## Area and Population.

The total area is 32.98 square miles. It extends lengthwise from north to south and breadthwise from east to west. There are altogether 68 villages with about 63,000 population and roughly 12,000 families living in about 8,300 houses. The main features of the Unions are given in Table V.

TABLE V.

*The Distribution of Villages, Population, Area and Public Funds of the Four Unions in Singur Health Centre.*

Serial No.	Unions.	Area in sq. miles.	No. of villages.	Population	PUBLIC FUNDS.		Total.
					Union Board.	Hospitals and dispensaries.	
1	Singur . . . . .	8.71	20	12,260	3,000	5,409	8,409
2	Balarambati . . . . .	7.86	21	14,664	3,230	818	4,046
3	Bora . . . . .	7.87	12	14,311	1,715	1,720	3,444
4	Begumpur . . . . .	8.54	15	21,471	5,072	928	6,000
	TOTAL . . . . .	32.98	68	62,736	13,017	8,882	21,899

## Approach and communications.

The village Singur where the Head. Quarters are located is only 21 miles from Calcutta. It is accessible both by rail (Howrah-Tarakeswar Line) and by road. The latter is a metalled road, at present in bad repairs, branching from the Grand Trunk Road north of Sheoraphuli. The villages in the Singur Union are approachable either through *Katchha* raised roads or meadow paths. (See photos 12-17). These are unsatisfactory in many ways and communications are difficult for several months during the monsoon. Begumpur and Balarambati are situated along the Howrah-Burdwan Chord Line, the former being about 17 miles and the latter about 21 miles northwest of Calcutta. Begumpur is also accessible through a metalled road which start-

ing from Uttarpara passes through Janai and Adan and runs *viâ* Begumpur to Bora and from there to Serampore. The last portion is at present not motorable. Bora may also be reached by a stretch of metalled road, two miles long, connecting it with Manirampur railway station on the Chord Line. While the villages in the Begumpur Union are comparatively easily accessible, those in the other three Unions have poor communications, and movements during the rains are almost impossible.

Some of the village roads are nominally maintained by the District Board, some by the Local Board (now defunct) and the rest by the Union Boards. During the dry season cycling is possible from village to village except where the roads are broken up by bullock carts and water courses. Some villages in Balarambati and Bora Unions are altogether without any approach roads and no wheeled traffic is possible even when it is dry.

The Howrah-Burdwan Chord and the Howrah-Tarakeswar Lines cross at Kamarkundu, a village in the Balarambati Union. The Tarakeswar Line crosses through the northern part of the Singur Union while the Chord runs through the Begumpur Union and between Balarambati and Singur Unions, thus enclosing a major part of the area in a triangle (*vide* Map I).

### Climate.

Certain meteorological records have been routinely maintained at Singur since 1941 by the Sanitary Engineering Section.

It is hot and moist during the greater part of the year. However, there is considerable variation in temperature in the course of the year, the minimum temperature may be as low as 44° F. and the maximum may touch 105° F. Relative humidity hardly ever goes below 50 per cent., and most of the time it is above 80 per cent. and remains near-about 100 per cent. for weeks. There are considerable diurnal variations sometimes ranging between 50 and 100 per cent.

The year may be divided into four seasons namely, winter from mid-November to the end of February, followed by a prolonged summer which lasts till the middle of June when the monsoon breaks. The rainy season extends to the middle of October followed by a brief autumn. The meteorological records for 1943 are shown in Charts I, II and III. The mean monthly maximum and minimum temperatures are given in Appendix III(a).

The average total rainfall is about 60 inches but it fluctuates widely from year to year (between 35 to 85 inches). The distribution of rainfall throughout the year is roughly as follows: less than 5 inches from November to February, about 7 inches from March to May and 40 to 50 inches between June to October. The monthly rainfall records as maintained at Singur from 1941 to 1944 are given in Appendix III(b).

### Physiography.

It is a part of the flat Gangetic delta in south-west Bengal, studded over with close-set villages. It lies between two great rivers running parallel from north to south namely the Damodar which is 14 miles to the west of the area and the Hooghly which is 8 miles to the east. The former is a torrential river

and the latter is a tidal river. The general slope of the country is from north-west to south-east but there being little gradient the natural drainage problem is difficult. It is further complicated by the erection of embankments for various purposes which prevent the natural flow of water. Enclosing, as they do, low lying land with insufficient outlets, they cause accumulation of large sheets of water during and after the rains. Besides, the removal of earth for raising the village sites and for building houses has created innumerable dug-pits (*dobas*) and tanks, some of which are of large size and have been specially made to hold water for drinking, household and irrigation purposes, thus producing unconnected more or less permanent water surfaces locally in and around the villages.

Originally the flood water from the Damodar periodically flushed out the area and it drained away into the Hooghly. A number of natural interconnected channels through which the water mainly flowed may still be recognised, but all of them are now irregularly silted up and do not adequately function. Attempts, though unsuccessful, have been made to replace the natural drainage by a few artificially cut drains. The only inlet of water from the Damodar at present is the Eden Canal System which is designed for purposes of irrigation only and does not help to flush the area. As a result, the five rivulets, namely, the Kananadi, Julki, Ghia, Kunti and Saraswati which traversed through the area are now dead (photo 22) but being low beds, they hold water after the rains much longer than the surrounding country, specially between the cross bunds erected by the people (photo 23) to conserve water for irrigation purposes in dry seasons. They are over-grown with vegetation and act as breeding places for mosquitoes. The location of these rivers is shown in Map II. In addition to these dead rivers there is a natural channel called the 'Kahakhal' running north and south for a distance of 5 miles through Singur and Balarambati Unions. Of the artificial channels mention has already been made of the Eden canal which lies outside the area but is connected with the old beds of the Kananadi and the Ghia. The Gopalnagar cut (see photos 20 and 21) joins the Kananadi with the Saraswati thus carrying the water from the Damodar into the latter river. An other artificial channel is the Dankuni drainage system. This scheme was inaugurated in 1873 with the object of draining the low lying lands of Dankuni area east of Bora and Begumpur Unions. It is a 'Y' shaped drain with openings in the river Hooghly at Baidyabati (inlet) in the north and at Bally (outlet) in the south. The longer northern limb of the Y commences beyond the northern boundary of the Singur Union and running southward through the adjoining Union to the east joins the shorter limb coming from the Serampore thana, somewhere east of Begumpur Union. It does not act efficiently unless there is a good head of water after the rains. However, when necessary, water can be let in through the lock-gate at Baidyabati along the channel for purposes of irrigation. It also breeds mosquitoes.

The embankments which directly or indirectly affect the area under consideration are chiefly of three types, *viz.* :-

- (1) River embankments. The main embankment of this description runs along the left bank of the Damodar. It was designed to prevent flooding of the area. There are many other transverse

bunds across the beds of the dead rivers and khals as already mentioned.

(2) Railway embankments. They are 3 in numbers—

- (i) The Howrah-Burdwan Main Line, built in 1851.
- (ii) The Sheoraphuli-Tarakeswar Branch Line passing through Singur.
- (iii) The Howrah-Burdwan Chord Line built in 1914. It passes through Begumpur, Bora and Balarambati Unions.

(3) Road embankments. There are 5 metalled roads and a number of *Katchha* roads running across the country. They are—

- (i) The Grand Trunk Road running north and south.
- (ii) The Chinsura Khanpur Road.
- (iii) The Baidyabati-Tarakeswar Road.
- (iv) The Serampur-Manirampur Road.
- (v) The Uttarpara-Adan-Begumpur-Bora Road.

These embankments have completely prevented the natural flooding and flushing, have caused the death of the rivulets, have reduced fertility of land and have increased malaria in the locality.

The most striking feature of the villages is the presence of a large number of *dobas* and tanks around each house or a group of houses. Economically, these serve at least threefold purposes, viz. :—

- (i) Provide water for cultivation of lands contiguous to houses.
- (ii) Provide water for domestic use and bathing purposes.
- (iii) Fish cultivation.

Unfortunately, these *dobas* and tanks also form the most potent breeding places of *A. philippinensis*, the local vector of malaria. The number of *dobas* vary from village to village, mainly according to its size as may be seen from Table VI in which some details for a group of representative villages from each Union are given.

TABLE VI.  
*Tank and Doba Enumerated in Certain Villages.*

Union Board.	Villages.	No. of houses.	Population	Total No. of <i>dobas</i> and tanks.	<i>Dobas</i> and tanks per house.	<i>Dobas</i> and tanks per head.
Singur	South Mamurpur	112	658	91	0.84	0.14
Balarambati	Bhola	225	1,392	97	0.43	0.07
Bora	Thakurhat	99	705	52	0.53	0.07
	Chak Pahlanpur	326	1,125	190	0.31	0.00
	Kamalapur	445	1,788	181	0.11	0.10
Begumpur	Nalty	379	2,078	188	0.50	0.00
	TOTAL	1,580	7,746	715	0.15	0.00

Thus on an average there is approximately one tank or *doba* for two houses (families ?) or for 10 persons.

### Irrigation.

As already mentioned the north eastern part of Singur Union receives the benefit of irrigation by the Eden Canal through the Kananadi, the Ghia, the Gopalnagar cut and the Saraswati. The usual method of irrigation which is carried out during the winter and early summer is lifting from *dobas* and tanks or from the accumulations in the beds of the dead rivers by means of a *donga* (or steel boat-like device) worked by manual labour. (See photograph No. 19). So far as the malaria problem is concerned, the present system of irrigation has potentialities both for good and for evil, perhaps it has done more harm than good.

### Soil and sub-soil.

The soil is alluvial mostly clayey but deposits of sand are found in some places. It is still fairly fertile but in the absence of periodical renewals of silt deposits by flood water from the Damodar, progressive deterioration is inevitable. For vegetable cultivation the farmer has to manure the land heavily with farm yard manure and oil cake.

The sub-soil is mostly a mixture of sand and clay or of clay and sand in alternate layers. Due to impervious clayey layers there is little percolation of rain water. The level of the sub-soil water is high being on an average only three to six feet below the surface depending upon the season.

The temperature of the ground water varies but little and according to Bhaskaran (1944) its biological characters are not greatly affected by season.

### Sources of water supply.

Tube-wells form the main sources of drinking water. A survey of the existing water sources of Singur and Balarambati Unions recently carried out by Subrahmanyan and his associates (1944) shows that in an area of 16.5 sq. miles there are 155 public and 99 private tube-wells. On an average there are 82 persons to a tube-well in Singur Union and 141 persons in Balarambati Union. However, only 80 per cent. of the public wells and 94 per cent. of the private wells were found in working order; forty-three per cent. of the public and 21 per cent. of the private tube-wells were in poor state of repairs. The following defects were noted :—

- (i) Broken studs and bolts.
- (ii) Worn out leather buckets.
- (iii) Leaky leather washer and valve at the foot of pump.
- (iv) Pump not fluctuating.
- (v) Filter choked.
- (vi) Head of pump broken.
- (vii) Pump handle broken.

Besides the tube-wells mentioned above there were 56 open wells of which only 10 were used for drinking purposes. *Dobas* and tanks have been entirely given up as sources of drinking water except by a few widows and old women. However, for domestic purposes they are exclusively used. Although a

complete census has not been made in Bora and Begumpur Unions, it is estimated that there are 65 public tube-wells in the former and 78 in the latter Union.

### Types of Villages.

The villages differ in size and to a certain extent in type. There are three main types of villages, *viz.* (1) closely set houses with crowding of population within short space in a manner resembling a rural town. (2) Typical Bengal village with houses separated from one another by tanks, *dobas*, bamboo or banana groves or even open agricultural lands. (3) Five to ten houses clustered together, the clusters being separated by tanks, *dobas*, groves or fields. The houses are generally built on raised lands as already described. (See photos 2-4.)

A typical village in this area consists of 150 to 200 houses or 200 to 300 families. Some families live in separate houses, others reside in separate rooms built round a common courtyard, where paddy is stored in '*morais*' and a creeper or two of marrow are spread out over a bamboo stage. In most villages banana groves or vegetable gardens extend on one or both sides of the house, the front gate lying above the serpentine road or lane which skirts the tanks or plantations. Frequently four or five houses form a group separated by big tanks, banana plantations, vegetable gardens or bamboo groves. As a rule a village is inhabited by a single community such as the Maheshyas, other Hindu communities or entirely by Muslims. Houses are built of mud with baked clay tile roofing. Here and there a *pucca* house may be seen and not infrequently one comes across small polished cemented plinths by the side of the main entrance. The growing popularity of cemented floors is evidenced by an occasional cemented floor in the veranda or even inside the room of an otherwise *kachha* house. For pictorial views of the rural environment described above reference may be made to Appendix VIII (photos 5-9).

### Sanitary Assessment of Houses.

Sanitary survey of 589 houses was carried out. This represents roughly 7 per cent. of the houses in the Health Centre Area.

General distribution of families in houses: A house is, as a rule, built to accommodate one family (*vide* Table VII). However, about 20 per cent. of houses are occupied by more than one family, about 12 per cent. of them lodge 2 families, 4 per cent. three families, 2 per cent. 4 families, and a few houses contain as many as 5 or 6 families.

TABLE VII.

*Distribution of Houses According to the Number of Families.*

Houses.	Number of families.					
	1	2	3	4	5	6
Number . . . . .	474	60	24	13	5	4
Percentage . . . . .	80.5	11.7	4.1	2.2	0.8	0.7

TABLE VIII.

*Distribution of Houses According to the Number of Inmates.*

House.	No. of inmates per house.																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	20+
Number	24	12	61	72	69	58	59	31	30	30	16	15	13	11	10	4	6	0	3	5	24
Percentage.	1.1	7.1	10.4	12.2	11.7	9.8	10.0	5.3	5.1	5.1	2.7	2.5	2.2	1.9	1.7	0.7	1.0	1.0	0.5	0.8	4.1

The number of inmates in a house vary from one to as many as 61 (in one instance). While the average size of the family is 5.9, the average number of persons per house is 7.5. Generally, a house accommodates not more than 10 persons (81 per cent.). The houses lodging four or five persons are most frequently met with (12.2 per cent.). About 4 per cent. of houses lodge more than 20 persons or more and a similar proportion have single inmates (see Table VIII). We shall revert to the discussion of adequacy of accommodation later on.

From health point of view, the number of children per house is a matter of considerable interest. Distribution of houses according to number of children is set out in Table IX.

TABLE IX.

*Distribution of Houses According to Number of Children per House.*

House.	No. of children per house.													
	0	1	2	3	4	5	6	7	8	9	10	11	12	12+
Number . . .	126	104	105	95	58	35	19	12	13	7	4	3	2	6
Percentage . . .	21.4	17.7	17.8	16.1	9.8	5.9	3.2	2.0	2.2	1.2	0.7	0.5	0.3	1.1

It will be seen that in more than one-fifth of the houses there is no child and in over one-sixth of them the child is without a companion. In other words, only in about 60 per cent. of houses the problem of more than one child arises. In such houses two to three children is the rule, but 4 to 5 children are not uncommon. While the percentage of houses progressively decreases as the number of children increase, 12 or more children in a house may be occasionally seen. In one instance, there were as many as 23 children. Housing conditions therefore preclude any possibility of effective isolation in case of infectious disease, particularly the eruptive fevers. Apart from close personal contact of children in a house, promiscuous defaecation and careless disposal of nasal and respiratory secretions as well as of wash water are calculated to disseminate infections in the house and in the immediate neighbourhood. These facts should be borne in mind in connection with the discussions on morbidity and mortality amongst infants and pre-school children (see Chapter XI).

TABLE X.

*Distribution of Houses According to Agency of Construction.*

Houses.	Agency of construction.				
	Self.	Village <i>mi-tri</i> .	Outside contractor.	Self and village <i>mi-tri</i> .	Village <i>mi-tri</i> and outside contractor.
Number . . . . .	210	206	10	90	2
Percentage . . . . .	36.3	46.6	1.7	15.6	0.3

*Agency of construction.*—Houses are practically always constructed by the villagers without outside assistance (*vide* Table X). Excluding the 11 houses for which information is not available the owners themselves built 36 per cent. of the houses without professional assistance and another 16 per cent. with the help of village masons, 46 per cent. of the houses were put up by the village masons without outside assistance and 2 houses (0.3 per cent.) with the help of outside contractors. Only 1.7 per cent. of the houses were wholly built by contractors from outside the village. It would thus appear that even for houses costing Rs. 1,000 or more local builders are generally good enough.

*Cost of house construction.*—It is difficult to estimate the cost of construction of houses but in making this estimate the information received from the owners and personal judgment of the investigators have both contributed. It may be assumed that the labour employed without cash payment has not been included. However, a rough distribution of houses according to the cost of construction as well as the average number of occupants is given in Table XI.

TABLE XI.

*Distribution of Houses According to the Cost of Construction and the Average Number of Inmates.*

Houses.	Cost of construction in rupees.							Total.
	—25	—50	—100	—250	—500	—1,000	1,000+	
Number . . . . .	17	44	70	170	105	65	106	586
Percentage . . . . .	2.9	7.5	11.9	28.9	17.8	11.0	18.0	99.5*
Average No. of inmates	4.6†	4.0	4.6	6.0	8.0	8.0	13.0	

\* No information about cost of construction is available for 3 houses.

† Excluding one extra-ordinary family this number is reduced to 3.4.

It will be observed that about one-fourth of the houses cost as little as less than a hundred rupees to construct, the largest percentage of houses (28.9) are built for Rs. 100 to Rs. 250 only, a little less than half the houses cost over Rs. 250 and quite a substantial number (18 per cent.) cost more than Rs. 1,000. A rough estimate of the average cost of a house in this area is Rs. 500 as against Rs. 400 estimated for rural areas by the Bombay Planning Committee, but it may be remembered that average number of inmates.



per house in the present survey is 7.5 as against five calculated by them. The floor space available in Singur houses is much below their standard (*see* page 28). It will be observed that with one exception the average number of inmates per house increase with the cost of construction or perhaps it would be more appropriate to say that the larger the number of persons occupying the house the more it costs to construct. The exception mentioned above is with reference to one house occupied by 22 persons, the cost of construction given being less than Rs. 25. One of the families residing in this house which consists of 5 members and for which alone information is available, is economically in the lowest class; even so, it is a question whether the cost of construction of the house could be so low as that. If this house is excluded the average number of persons in this category of houses is 3.4 only. While it would be contrary to the actual facts to say that the quality of houses does not materially vary, there is little doubt that building cost is, as a rule, mainly referable to the size of the house rather than to its quality. Further remarks on the cost of construction in relation to various items constituting the quality of the house are given later.

*Surroundings—Openness.*—Nearly 56 per cent. of the houses are detached and 24 per cent. semi-detached. However, the proportion of houses attached on three sides is not inconsiderable being 11.4 per cent. (*vide* Table XII). It may be stated that back to back houses are not open to the same objection as in the Western countries or in certain urban areas in this country, because of the customary inner courtyard.

TABLE XII\*.

*Distribution of Houses According to Contiguity with Neighbouring Houses.*

Houses.	Nature of House.			
	Detached.	Semi-detached.	Attached on two sides.	Attached on three sides.
Number . . . . .	312	135	50	64
Percentage . . . . .	55.6	24.1	8.9	11.4

\* In this and in subsequent discussions the houses for which information for any particular item has not been noted, have been dropped out of consideration.

Almost invariably a house has an inner courtyard along two or three sides of which there is a row of rooms almost always set behind an open verandah. These rows of rooms may be continuous or broken up into a number of units or huts with open spaces in between them. The courtyard provides space for *morais* (paddy stores) or other forms of grain stores and more often than not for a bamboo roof over which are spread out creepers of gourd or other vegetables (photos 8-9). Thus individual rooms have open front and back (unless the adjacent house leaves no side space) but the sides of the room are closed. The house may or may not have a space at the side and on the back but front wall of the courtyard is seldom set back from street alignment (*see* Table XIII). However, in many instances the front door may open on a

narrow passage through which it communicates with the street and beyond this passage may be a tank or *doba* of varying size. Similarly, the back or one or the other side may adjoin a tank or *doba*. This description would explain the reason why the majority of the houses belong either to the category in which the front space including the streets (which is usually narrow) is less than a quarter of the height of the house or compound wall, or it is a large open space. The same applies to back space, but in this case, houses with large back space are more common. Again, houses with a big front space are also likely to have a large back space and conversely houses with small front space have, as a rule, small back space. Less frequently, a large front space may be associated with a small back space and *vice-versa*. Though we have not carried out separate analyses for each Union, the villages of Begumpur Union largely contribute to the category of houses in which the front space is very small or is of intermediate size. Again in this Union there is little or no space between the houses and unlike the other three Unions, double or three storied houses are common here.

TABLE XIII.

*Distribution of Houses According to Ratio of Open Space (Front and Back) to the Height of the House.*

Back space : height of the house.	Front space : height of the house.				Total.	Percentage.
	$-\frac{1}{4}$	$-\frac{1}{2}$	-1	2 and above.		
$-\frac{1}{4}$ . . . . .	74	13	11	21	119	35.2
$-\frac{1}{2}$ . . . . .	3	15	2	8	28	8.1
-1 . . . . .	3	6	12	15	36	10.4
2 and above . . . .	20	10	25	94	155	46.4
TOTAL . . . . .	100	50	50	138	338	
Percentage . . . . .	37.7	13.5	11.0	37.8		

In Table XIV information about the ratio of the open space to the height of the building is shown for the two sides. As might be expected there is a remarkable correspondence in the distribution of houses in respect of varying sizes of open spaces on the right and on the left sides in relation to the height. It will be noticed that houses with plenty of side space and houses with little or no side space are more common than houses of intermediate side space. Houses which are open on one side are also frequently open on the other side and *vice versa*:

TABLE XIV.

*Distribution of Houses According to Ratio of Open Space on the Sides (Right and Left) to the Height of the Houses.*

	Right side space.				No information.	Total.	Percentage*.	
	— $\frac{1}{2}$	—1	—1	2+				
Left side space	— $\frac{1}{2}$	114	2	3	13	23	155	47.0
	— $\frac{1}{2}$	7	31	0	4	6	48	14.5
	—1	3	4	13	0	5	31	9.4
	2+	11	2	8	50	10	96	29.1
No information . . .		40	10	11	31	158	250	
Total .		184	49	35	113	208		
Percentage .		48.3	12.0	9.2	20.4			

\* Percentages based on those for which information is available.

In conclusion it may be stated that there are practically few or no obstructive houses. A fair number of houses have ample open space, front and behind and not infrequently on the sides as well. The arrangement of the living rooms along-side the inner courtyard permits good circulation of air.

*Cleanliness—Drainage and cleanliness of compound.*—Most of the compounds and open spaces round about the houses are ill-drained. Nearly 44 per cent. have weedy growths and 14 per cent. have rank growth or jungle. There does not appear to be any relationship between the cleanliness of the compound and its drainage. However, the number of houses in which the compounds are ill-drained and have weeds or rank vegetation is not inconsiderable (*vide* Table XV).

TABLE XV.

*Drainage and the Cleanliness of the Compound.*

Drainage.	Jungle and weeds.				Total.	Percentage.
	Clean.	Weedy.	Rank growth.	Jungle.		
Good . . . . .	13	27	1	3	44	7.5
Inadequate . . . . .	40	83	7	4	184	22.0
Poor . . . . .	45	65	24	12	146	25.0
Not drained . . . . .	140	81	12	21	260	44.5
TOTAL .	244	250	44	40	584	
Percentage .	41.8	43.8	7.5	6.8		

*Mosquito breeding grounds.*—While bad drainage helps to maintain high humidity, the breeding of mosquitoes largely takes place in low lands made of dead rivers and in tanks and *dobas*. As has been stated above there is a tank or a *doba* to practically every two houses. Since mosquito breeding takes place chiefly along the edges of these water collections, specially when they are not clean, we have measured the perimeters and classified them roughly as clean and dirty. The average size of clean and dirty perimeters per house is 43.4 ft. and 55.1 ft. respectively. The frequency distribution of the houses with different sized clean and dirty perimeters is given in Table XVI.

TABLE XVI.

*Distribution of Houses According to the Size of Perimeter of Tanks and Dobas\*.*

Nature of perimeter.	Average perimeter per house.	Houses.	Size of the perimeter in feet.							Total No. of houses.
			Nil.	—20	—50	—100	—150	—200	200—	
Clean	55.6	No.	101	223	122	53	21	30	30	589
		Per cent.	17.1	39.0	20.7	9.0	3.6	5.1	0.6	
Dirty	57.9	No.	45	198	140	100	43	27	30	589
		Per cent.	7.6	33.6	24.8	17.0	7.3	4.0	5.1	

\* Some houses adjoin tanks and *dobas* not belonging to the premises.

Catches of adult anopheles were made in some of the houses and larvae were collected from the ponds and tanks situated near habitations. A brief statement of the anopheline fauna as found during the survey is given in Table XVII.

TABLE XVII.

*Anopheline Fauna of the Health Centre Area from January to June 1944.*

	January.	February.	March.	April.	May.	June.
No. of houses visited	69	71	27	21	54	32
No. of tanks and <i>dobas</i> examine	23	53	18	5	31	3
<i>A. subpictus</i>	+	+	+	+	+	+
<i>A. hyrcanus</i>	+	+	+	+	+	+
<i>A. annularis</i>	+	+	+	—	+	+
<i>A. pallidus</i>	+	+	—	+	—	—
<i>A. ramsayi</i>	+	+	—	+	+	+
<i>A. barbitrostris</i>	+	+	+	—	+	+
<i>A. aconitius</i>	+	+	+	—	+	—
<i>A. varuna</i>	—	+	—	—	—	—
<i>A. vagus</i>	—	—	—	—	+	—

*A. philippinensis* is believed to be the only malaria carrying species in this part of Bengal. This species was conspicuous by its absence during the period of the survey. Previous records also show that *A. philippinensis* is rarely found during the first half of the year. However, as may be seen from table CXLVI 326 malaria cases were found in the course of the survey. Since the malaria curve may be seen from Chart VII is low during this period it is likely that fresh infections were relatively few at the time. Even so, the question arises whether *A. philippinensis* breeds or the adults survive in sufficient numbers to explain such transmission of malaria as may occur during the first half of the year, or some other carrier species hitherto unsuspected is responsible for fresh infections. Unfortunately no dissections for mosquito infections could be carried out but perhaps it may be worthwhile to search for other possible carrier species, specially when known malaria carriers like *A. aconitus* and *A. varuna* and suspected species like *A. annularis* have been found. The anti-malaria organisations working at Singur and its environs, during the six months preceding the survey, dissected 663 anophelines of various species (see Table XVIII) of which only 3 *A. philippinensis* were found carrying sporozoites in their salivary glands. The number of mosquitoes of species other than *A. philippinensis* is small and, therefore, it is not possible to exclude them from being carriers on the basis of these results. It may be noted that no *A. philippinensis* were dissected during July and August.

TABLE XVIII.

*Dissections carried out during the Period, July to December 1943, of Anopheles found in and around Singur.*

	July.	August.	September.	October.	November.	December.	Total.
<i>A. philippinensis</i> . . . .	0	0	161*	81*	180	72	404
<i>A. aconitus</i> . . . . .	9	11	4	12	40	5	81
<i>A. varuna</i> . . . . .	0	15	0	0	8	0	23
<i>A. annularis</i> . . . . .	3	0	1	4	4	4	16
<i>A. ramsayi</i> . . . . .	6	0	7	4	3	9	29
<i>A. pallidus</i> . . . . .	0	0	0	0	5	8	13
<i>A. hyrcanus</i> . . . . .	0	0	1	0	0	0	1

\* Two infected mosquitoes were found in September and one in October.

*Fly breeding.*—From Table XIX it will be seen that vast majority of the houses have small breeding places for flies, and a few provide extensive breeding grounds, but the number of houses which do not breed flies is less than 2 per cent. Here again, improvements, if and when carried out, should be easily discernable. The problem of fly breeding is closely related to the question of disposal of refuse containing human faeces and of the stable and cowshed refuse. Information on these points is contained in tables XX, XXI and XXII. Since many families have no conservancy system the question of disposal of faecal matter does not arise. The commonest method of disposal is by throwing it away indiscriminately which is the one most objectionable and unhygienic. Equally objectionable is to put them in heaps and this practice is frequently followed. (See photo 10) Less than

per cent. of households take the trouble to cart the refuse to their fields and to make use of them. None of them follow the most scientific method, namely, composting, but a small per cent (3 per cent) take the trouble of doing something to make faecal matter non-offensive. The problem of latrines is further discussed on page 36.

TABLE XIX.  
*Fly Breeding, Rat Harbourage and Other Pests.*

	Fly breeding places.						Rat harbourage.			Other pests.		
	Nil.	Small.	Medium size.	Large.	Extensive.	Total.	Present.	Absent.	Total.	Present.	Absent.	Total.
No. of houses.	11	423	136	12	2	580	566	22	588	560	10	570
Percentage	1.9	72.7	23.0	2.0	0.3	..	96.3	3.7	..	98.2	1.8	..

TABLE XX.  
*Disposal of Refuse Containing Human Faeces.*

	Does not arise.	Heap	Pit covered.	Pit uncovered.	Inclined.	Water.	Thrown away indiscriminately.	Removed to filed.	Removed by public agency.	Composting.	No. of houses.
No. of houses	234	100	1	17	0	19	301	56	0	0	580
Percentage	40.3	17.2	0.2	2.9	0	3.3	51.9	9.7	0	0	..

As may be seen from table XXI, the usual practice (82 per cent) is to throw away refuse and garbage indiscriminately. In 29 per cent of the cases a heap is made. In 13 per cent the refuse and garbage are hauled up to the farms, where not only they are made use of as manure, but are most sanitarily disposed off because the fauna and flora of the farms vigorously attack them and reduce them to nonfomentable inorganic salts which are readily utilised by the plants. This practice may be encouraged. Pits are made in 5 per cent of cases but only half per cent. are covered. It would appear that in 1 per cent. of houses, there is no garbage or refuse or not enough of it, so as to raise the question of disposal.

In 198 houses there are no stables or cowsheds. Of the remaining 391 houses, 186 practice more than one method of disposal of the refuse, information about which is contained in table XXII. For the liquid refuse, there appears to be no arrangement in over 85 per cent. cases, in nearly 13 per cent. there is a sump or cesspool without any arrangement for outlet. Only in 2.1 per cent. there is a sump with an outlet. In most instances the cowdung is converted into cakes (in 61.5 per cent.) or it is stacked in heaps (29.6 per cent.); manure pits are relatively infrequent (8.8 per cent.). Considering both the liquid and solid waste, the most common practice is to make cowdung cakes and to let the liquid portion take care of itself, or to stack up the dung in heaps and let liquid find its own way.

TABLE XXI.  
*Disposal of Garbage and Refuse.*

Houses.	Disposal.						Thrown indiscriminately.	Removed to field.	Removed by public agency.	Composting.	Total houses.*
	Does not arise.	Heaps.	Pit covered.	Not covered.	Incinerated.	Water.					
Number	6	171	3	20	1	1	480	75	0	0	586
Percentage %	1.0	29.2	0.5	4.4	0.2	0.2	81.9	12.8	0.0	0.0	..

\* In many of the houses surveyed more than one method of disposal were adopted.

TABLE XXII.

*Distribution of Houses According to the Method of Disposal of Solid and Liquid Waste From Stable and Cowshed.*

Method of disposal of liquid waste.	Method of disposal of solid waste.			Total No.	Percentage.
	Manure pit.	Heaps.	Dung cake.		
Sump with outlet	3	4	5	12	2.1
Sump without outlet	3	33	37	73	12.7
No arrangement	45	184	313	492	85.3
Total	51	171	355	577	..
Percentage	8.8	29.6	61.5	..	..

*General cleanliness of the premises and rooms.*—As will be seen from Tables XXII and XXXIV, in which cleanliness of the premises and of the rooms have been correlated with the cost of construction of the building, there are relatively few clean houses. As regards premises one fourth of the houses may be regarded as dirty and only 10 percent as clean, the rest being moderately clean. Starting from as high a figure as 59 per cent. for houses costing less than Rs. 50 the dirty houses decrease in frequency to only less than 5 per cent. (4.7) for houses worth Rs. 1,000 or more, and while none of the houses of the lowest category are clean, over 28 per cent. of those costing Rs. 1,000 or more are so. While there may be better facilities in more expensive houses, additional factors of better education and social standards may partially account for the association of cleanliness with cost of building. The same remarks apply equally to cleanliness of the rooms inside. In this case, a sudden improvement is observed, when the cost of building exceeds Rs. 500. In any case, much remains to be accomplished in the way of improvement of houses both inside and outside.

TABLE XXIII.

*Distribution of Houses According to the Cleanliness of the Premises and Cost of Building.*

	Cost in rupees												No infor- mation.	Total.	P.C.
	—50		—100		—250		—500		—1,000		1,000—				
	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.			
Clean . .	0	0	4	5.1	13	7.6	5	4.8	9	13.8	28	26.4	0	50	10.0
Moderately clean.	25	41.0	46	58.2	109	64.1	83	70.0	47	72.3	73	68.9	3	386	65.5
Dirty . .	36	50.0	29	36.7	48	28.2	17	16.2	9	13.8	5	4.7	0	144	24.4
Total .	61		79		170		105		65		106		3	580	

TABLE XXIV.

*Distribution of Houses According to the Cleanliness of the Rooms and Cost of Building.*

	Cost in rupees.												No. information.	Total.	P.C.
	—50		—100		—250		—500		—1,000		1,000—				
	No.	P.C.	No.	A.C.	No.	P.C.	No.	P.O.	No.	P.O.	No.	P.C.			
Clean	0	0	4	5.6	8	5.0	4	4.1	11	17.5	24	25.8	0	51	9.8
Moderately clean.	26	44.1	44	62.0	118	73.3	82	84.5	45	71.1	69	72.6	1	385	70.1
Dirty	33	55.0	23	32.4	35	21.7	11	11.3	7	11.1	2	2.1	2	113	20.6
Total	59		71		161		97		63		95		3	549	

*Living Rooms.—Over-crowding.*—The distribution of houses according to the number of occupants and the floor-space per person is given in Table XXV.

TABLE XXV.

*Distribution of Houses According to Number of Occupants and Floor Space.*

Floor space per person in sq. feet.	No. of occupants.											Total.	Per cent.
	1	2	3	4	5	6	7	8	11-12	13-20	21—		
	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.	No.		
—36	2	21	38	51	50	44	41	44	41	45	19	396	67.3
36—	13	14	18	18	14	13	10	14	19	11	4	154	26.2
42—	4	4	4	2	4	1	0	1	0	1	1	22	3.7
50—	5	3	1	1	0	0	2	2	1	1	0	16	2.7
Total	24	42	61	72	68	58	50	61	61	58	24	588	99.9



A perusal of Table XXV reveals a state of gross overcrowding as majority of the houses permit less than thirty-six square feet of floor space per person. Except when a person is a solitary occupant of a house, more often than not the floor space per person is less than 36 sq. ft. In little over a quarter of the houses the allotted floor space lies between 36 sq. ft. and 42 sq. ft. and only in a little over 6 percent of houses more than 42 sq. ft. is available. It is comparatively rare to find houses allowing more than 50 sq. ft. of floor space per person. The Bombay plan (1944) considers 100 sq. ft. of floor space as the minimum requirement. In the present study majority of the houses provide only one-third or less of that space.

It will also be observed that the larger the number of occupants, the smaller is the floor space available per person ; in other words, the size of the house does not increase as the number of inmates increases. Knowing as we do that furniture and other household effects further encroach upon the floor space it would not be surprising if diseases common to the over-crowded communities should frequently occur. We have seen that larger the households the less floor space is available per person, and also the greater the cost of construction the larger is the number of inmates. Under the circumstances, the more costly houses do not have a decided advantage over the less expensive one, so far as over-crowding is concerned.

*Ventilation.*—Ventilation has been described as good in a little over one quarter of the houses (26 percent). Most of the houses are inadequately ventilated and some of them (16 per cent.) are poorly ventilated. This is not surprising, when it is remembered that the floor space allotted per person is inadequate and there is gross over-crowding. However, from what has been said before, one should have expected that poor ventilation will be associated with houses having larger number of inmates than those with fewer occupants. This is not borne out by the Table XXVI, in which the distribution of houses according to the state of ventilation is shown for varying number of occupants. There appears to be better provision of ventilation in accommodating moderate number of persons than those having either small or large number of inmates. The observations on ventilation were probably not carried out properly, as early morning visits were difficult to make and no kata-thermometer readings were recorded. Dependence on observations of openings in the rooms, for purposes of estimating the state of ventilation at a time, when the room was mostly empty is not satisfactory, and no account can be given of the actual state of ventilation when the room is fully occupied. It is not likely that more window space is provided as the number of occupants increases. There is every reason to believe that if the observations could have been taken according to the instructions given in the key, still worse conditions would have been recorded, particularly in houses occupied by large number of inmates. It may however be noticed that according to the present observations relatively better ventilation is obtained in houses costing over Rs. 100 and particularly in those costing over Rs. 1,000 (see Table XXVII).

TABLE XXVI.

Distribution of Houses According to Number of Occupants and Ventilation.

Ventilation.		Number of occupants.											Total.
		1	2	3	4	5	6	7	8-9	10-12	13-20	21+	
Good . . .	No.	8	14	13	16	20	10	17	16	13	16	11	154
	P.C.	33.3	83.3	21.7	22.2	20.4	17.2	20.3	26.2	21.7	27.6	45.8	26.3
Inadequate . .	No.	10	20	25	39	40	42	34	38	42	37	10	337
	P.C.	41.7	47.6	41.7	54.2	58.8	72.4	58.6	62.3	70.0	63.8	41.7	57.6
Poor . . .	No.	6	8	22	17	8	6	7	7	5	5	3	94
	P.C.	25.0	19.0	36.7	23.6	11.8	10.3	12.1	11.5	8.3	8.6	12.5	16.1

TABLE XXVII.

Distribution of Houses According to Cost and Ventilation.  
Approximate cost.

Ventilation		Cost in Rupees							No Inform- ation.	Total.
		—25	—50	—100	—200	—500	—1000	1000+		
Good	No.	4	5	13	41	13	14	63	1	154
	P.C.	23.5	11.4	16.7	24.1	12.4	22.2	60.0	33.3	26.3
Inadequate	No.	2	26	35	105	82	46	41	1	337
	P.C.	11.8	56.8	44.0	61.8	78.1	73.0	39.0	33.3	57.6
Poor . . .	No.	11	14	30	24	10	3	1	1	94
	P.C.	64.7	31.8	38.5	14.1	9.5	4.8	0.0	33.3	16.1
Total		17	44	78	170	105	63	105	3	585

*Lighting.*—We have used a more objective method of estimating the condition as regards light (*vide* key). Generally speaking, the rooms are fairly well lighted 22 per cent. being good, 61 per cent. moderately and only 16 per cent. poorly lighted. No definite relationship between the amount of light admitted into the rooms and the number of inmates in the house can be observed except in those in which the number of occupants is over 20, where the lighting conditions are good.

In respect of lighting the houses costing above Rs. 500, especially those worth more than Rs. 1,000 are definitely better than others (*vide* Table XXVIII). These are probably *pucca* (brickbuilt) houses.

TABLE XXVIII.

Distribution of Houses According to Cost and Condition of Lighting.  
Approximate cost.

Lighting.	Cost in Rupees.						Total.	
	—500		—1000		1000—		No.	Percent.
	No.	Percent.	No.	Percent.	No.	Percent.		
Good	58	14.0	14	22.2	58	55.2	130	22.2
Moderate	267	64.3	47	74.6	45	42.9	359	61.4
Poor	90	21.7	2	3.2	2	1.9	94	16.4
Total	415		63		105		583	100.0

*Dampness.*—Information regarding dampness of the floors and of the roofs is contained in Tables XXIX and XXX respectively. It will be seen that while in nearly 60 per cent. of the houses the floor is moderately dry, the leakage of the roofs is pretty frequent (56 per cent.). Not many houses can claim good dry floors which are necessary for the maintenance of health. These defects are however closely associated with the low cost of construction for, over 54 per cent. of the houses costing Rs. 1,000 or more have dry floor and over 97 per cent. of them have non-leaky roofs.

TABLE XXIX.

*Distribution of Houses According to the Dampness of Floors.  
Approximate Cost.*

													(COST IN RUPEES.)	
Condition of Floor.	—50		—100		—250		—500		—1000		1000—		Total.	P.C.
	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.		
Dry	0	0.0	5	6.3	8	4.7	8	7.6	13	20.3	57	54.3	91	16.8
Moderately dry	28	48.3	39	49.4	113	68.8	78	74.3	45	65.2	45	42.9	346	59.7
Damp	20	34.4	26	32.0	42	21.9	17	16.2	8	12.5	3	2.9	116	19.0
Flooded during rain.	10	17.2	9	11.4	6	3.0	2	1.0	0	0.0	0	0.0	27	4.6
Total	58		79		160		105		64		105		530	

TABLE XXX.

*Distribution of Houses According to the Leakage of Roofs and Cost of Building:*

Roofs.	—25	—50	—100	—250	—500	—1000	1,000—	Total.
Good order	1	6	13	48	44	43	103	258
Leaky	16	37	65	121	61	21	3	323
Percentage of leaky roofs	93.8	86.0	83.3	71.6	59.1	32.8	2.8	55.6

*Furnishing.*—House furnishings are poor. They are striking evidence of the low standard of living. Thirty-six per cent of the houses have nothing but floor to sleep on. In 41 per cent. of the houses wooden beds are available for some members, and only in 22 per cent. wooden beds or other type of beds are provided for all. Exclusive use of metallic utensils is limited to 0.5 per cent. of the houses. Generally both metallic and earthen-ware vessels are used for cooking (72 per cent.), and in 27 per cent. of the houses only earthen pots are used for cooking purposes (see table XXXI).

TABLE XXXI.

*Distribution of Houses According to Furnishings and Cooking Utensils.*

Furnishings.	Cooking utensils.				Percentage.
	Earthen.	Metallic.	Both.	Total.	
Sleeping on bed or wooden plank.	12	1	117	130	22.5
Sleeping on floor	94	1	112	207	36.8
Both	52	1	188	241	41.7
Total	158	3	417	578	
Percentage	27.3	0.5	72.1		

*Rat harbourage.*—The evidence of rat harbourage may not be always easy to observe and may be missed by inexperienced investigators. In the present survey the instructions given in the key and also personally to the investigating parties should have helped them to discover it. The results of observations are contained in Table XXXII, from which it is seen that all but few houses harbour rats. Unlike other factors considered above, rat harbourage is not directly related to the value of the building. As an antiplague measure, considerable success has been achieved in countries like Java, by improving housing conditions with a view to making them rat-proof. In this community these rodents may constitute a source of *Salmonella* infection. It would thus appear that planned improvement in house construction is required, if this objective is to be achieved.

TABLE XXXII.

*Distribution of Houses According to Rat Harbourage and Cost of the Building.*

Rat harbourage.	(Cost in rupees.)												No infor- mation.	Total.	P.O.
	—50		—100		—250		—500		—1,000		1,000—				
	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.O.			
Present	57	93.4	78	98.7	168	99.4	103	98.1	61	93.8	95	90.5	3	586	96.3
Absent	4	6.6	1	1.3	1	0.6	2	1.0	4	6.2	10	9.5	0	22	3.7
Total	61		79		169		105		65		105		3	588	

Table XXXIII shows that not even 5 per cent. of the kitchens fully satisfied our workers, and as many as one third of them were considered frankly bad. Much, therefore, remains to be done to improve the condition of this vital part of the house. A progressive improvement in the condition of the kitchen was, however, noted as the money value of the house increased. These observations relate to the general appearance of the kitchen. Further details may be of interest.

TABLE XXXIII.

*Distribution of Houses According to Cost and General Condition of Kitchen.*

General condition of kitchen.	(Cost in rupees.)												No information.	Total.	P.C.
	—50		—100		—250		—500		—1,000		1,000—				
	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.			
Good	0	0	1	1.4	2	1.2	6	5.8	5	7.0	14	13.3	0	28	4.9
Fair	21	37.5	36	48.6	103	61.3	62	60.2	44	69.8	85	81.0	3	354	61.0
Bad	35	62.5	37	50.0	63	37.5	35	34.0	14	22.2	6	5.7	0	190	33.2
Total	56		74		168		103		63		105		3	572	

*Cleanliness.*—Barely 7 per cent. of the houses had clean kitchens. They were moderately clean in two-third of the houses, the rest were dirty. Cleanliness of the kitchen was also related to the cost of construction of the house as may be seen from Table XXXIV.

TABLE XXXIV.

*Cleanliness of the Kitchen According to the Cost of Construction of the House.*

Cleanliness of kitchen.	(Cost in Rupees.)												No. Information.	Total.	P.C.
	—50		—100		—250		—500		—1000		1000—				
	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.			
Clean	0	0	2	2.7	12	7.1	4	3.8	5	7.0	16	15.2	0	39	6.8
Moderately clean.	26	46.4	47	63.5	101	61.9	69	66.3	44	69.8	86	81.9	3	379	66.1
Dirty	30	53.6	25	33.8	52	31.0	31	29.8	11	22.2	3	2.9	0	153	27.1
Total	56		74		165		104		60		105		3	573	

*Protection from flies.*—One of the most important considerations in the sanitation of kitchens is the arrangement made for the protection of food from flies. Only 17 or 3 per cent. houses satisfy the requirements. Exposure of food to this unclean insect is almost universal and even otherwise clean kitchens are not exempt (*vide* Table XXXV). None of the 134 houses costing less than Rs. 100 to build have protected kitchens. In the remaining 438 houses the cost of construction of which ranged between Rs. 100 and Rs. 1,000 or more only 17 exclude flies from food. We believe that it is a matter of considerable importance to organise anti-measures against alimentary infections. While much emphasis is rightly placed on satisfactory disposal of human faeces, specially in respect of their exposure to flies, enough attention has not been paid to the question of protection of food from flies. This may prove to be of equal value as a measure against the dissemination of bowel diseases. As there are but few confectionary shops in the villages kitchens constitute the main place of storage for cooked food.

TABLE XXXV.

*Distribution of Houses According to Approximate Cost and Food Protection from Flies.*

Food protection from flies.	Approximate cost.							Total.	Per-centage.
	—25	—50	—100	—250	—500	—1,000	1,000+		
Yes	0	0	0	3	4	5	5	17	3
No	17	42	75	163	101	50	98	555	97
Total	17	42	75	166	105	55	103	572	100

It is a question whether provision of built-in meat-safe which would add only a few rupees to the cost of the house could not be popularised in our villages. Incidentally, the food will also be saved from rats, crows, cats and dogs, as well as from monkeys, all these animals being serious rivals to man in the matter of getting at food. Singur health authorities may perhaps try out the feasibility of this proposition. It may be stated here, that less than 1 per cent of the houses (0.7 per cent.) have kitchens in which stores are protected from rats.

A satisfactory outlet for smoke is distinctly a matter of convenience and comfort for the housewife. Nearly 45 per cent. of houses have satisfactory kitchens in this respect. Without burdening the report with numerical data, it may be stated that the possession of this convenience is also related to the cost of building.

Another important factor in keeping the kitchen tidy and comfortable is the drainage of the floor. Less than 7 per cent. of the houses have satisfactory kitchens in this respect. Here, again, relation between the cost of building and drainage of the floor may be observed.

*Private facilities for bathing and washing:* A pond or *doba* is almost as much a part of the house and almost equally desired as the sleeping room in a Bengal village house. The visitor cannot help noticing how great a use the housewife makes of the pond adjacent to her house, however suspicious looking the water may be. It is used early in the morning for ablutions after defaecation, and that explains the accumulation of faecal matter not far from the tank. The busy housewife uses a corner of the pond for washing herself and the clothes as well as for cleansing the utensils and for soaking rice and dal and for carrying water to the kitchen. It is not surprising that private facilities for bathing and washing should be practically non-existent in the village houses. Only 2 per cent. of the houses have adequate private facilities for bathing and washing and 94 per cent. of them have no facilities at all (*see* Table XXXVI). It will take a lot of persuasion to induce people to have adequate private facilities for bathing and washing.

TABLE XXXVI.

*Distribution of Houses According to Private Facilities for Bathing and Washing.*

—	Not available.	Inadequate.	Adequate and used.	Adequate & not used.	Not known.	Total.
Total No. . . .	550	26	11	1	1	589
Percentage . . .	93.5	4.4	1.9	0.2	0	100.0

*Water supply:* The tubewell as a source of drinking water is rapidly catching the imagination of the people (*see* photo 11) and there is a definite demand for more and more tubewells. Nearly 96 per cent. of the households use tubewell water for drinking purposes. However, quite an appreciable number (2.7 per cent.) still use unreserved tanks. Surface wells, river water and reserved tanks constitute other sources of drinking water but households using these sources put together constitute only 1.6 per cent. of the total. With a little encouragement and education all but negligible proportion of the population should become tubewell minded. However, as has been observed in a recent investigation, this measure in itself will not prevent or even materially reduce the incidence of bowel disease, so long as the

environmental sanitation remains in a primitive condition, as at present. (See Table XXXVII.)

TABLE XXXVII.

*Distribution of Households According to Water Supply.*

	Drinking.						Domestic.				
	Tubewell.	Surface well.	Reserved tank.	Unreserved tank.	River.	Total.	Tubewell.	Surface well.	Reserved tank.	Unreserved tank.	No. of sources surveyed.
No. of houses .	563	4	1	16	4	588	14	0	1	560	1
Percentage .	95.7	0.7	0.2	2.7	0.7	100.0	2.4	0	1.4	96.1	100.0

In this connection it may be said that the people accustomed to think, more of water than of anything else as the main vehicle of infection for bowel diseases, argue that the use of water for household purposes, obtained from doubtful sources is chiefly responsible for infection. As a matter of fact 96 per cent. of the households use water from unreserved tanks for domestic purposes. Tubewell water is used only by 2.4 per cent. of households, reserved tanks by 1.4 per cent. and rivers by 0.7 per cent. Apart from labour involved in bringing water from the tubewells for domestic requirements, there is a popular belief that the pond water has superior qualities for cooking purposes. This may be so because the tubewell water is very often hard. It may be worthwhile to investigate the magnitude of the danger which actually arises from the use of infected water for domestic purposes and whether *doba* water maintains infections for sufficiently long period to constitute an important vehicle of transmission for organisms causing bowel diseases.

*Tube wells.*—Table XXXVIII shows that a little less than 40 per cent. of the houses are 200 or more yards away from tubewells. About 28 per cent. are between 50 and 200 yards. Only about 9 per cent. of the houses are fortunate in having tube-wells within 10 yards. It is therefore evident that apart from other considerations the housewife must be provided with tubewell very near the house before she could be induced to use tubewell water for her domestic use. It is satisfactory to note that 90 per cent. of the houses obtained their water supply from tubewells which were in good order at the time of the survey and only 0.5 per cent. of the houses complained that the wells were not in working order.

TABLE XXXVIII.

*Distribution of Houses According to the Distance From the Nearest Tube-Well.*

	—10 yds.	—50 yds.	—200 yds.	200 yds. and over.	Total.
Frequency . . . . .	48	137	167	221	563
Percentage . . . . .	8.5	24.3	27.0	39.3	

The survey included a detailed investigation of the condition of the tube-wells and their surroundings. From the analysis given in Table XXXIX

it will appear that over 80 per cent. of the tubewells have good aprons, in nearly 11 per cent. the apron is not satisfactory and nearly 9 per cent. of them have no aprons. The importance of apron is enhanced by the fact that 58 per cent. of the tubewells have inadequate leadaway drains and nearly 12 per cent. have none. On the other hand, the 6 surface wells are all open, two of which have good casing and good parapet and the other 4 bad casing and bad parapet. Only one well has good leadaway drain, three have unsatisfactory drains and two have none. In three instances common bucket is used and in two water is drawn from individual buckets. In one instance the well is liable to pollution from a latrine.

TABLE XXXIX.

*Distribution of Houses According to the Condition of the Apron and of the Leadaway Drains of the Tube-wells Nearest to Them.*

Leadaway drains.	Apron.			No information.	Total.	Percentage.*
	Good.	Bad.	Nil.			
Adequate . . . . .	157	3	9	1	170	30.2
Inadequate . . . . .	271	41	11	3	326	58.0
Nil . . . . .	22	17	27	0	66	11.7
No information . . . . .	2	0	2	23	27	
Total . . . . .	452	61	49	27	589	
Percentage* . . . . .	80.4	10.0	8.7			

\* Percentages are based on those for which information is available.

*Tanks.*—All but 11 of the 560 unreserved tanks for which information is available are obviously liable to contamination. The amount of water in the tanks is insufficient in 38 per cent. available in season only in 10 per cent., sufficient in 30 per cent. and abundant in 22 per cent. As one would expect, nobody boils or otherwise treats drinking water, whatever be the source of supply.

*Latrines.*—There is no latrine in 93 per cent. of the houses. The latrines are mainly of bucket type, these being 31 out of a total of 38; one is a pit latrine and 6 are bored-hole latrines. Subsequent surveys would show how much success has been achieved in popularising the bored-hole latrine which at present is believed to be the best solution of the problem in rural Bengal. Small though the number of latrines is, the households in which they are provided do use them except in a few instances (*see* Table XL). However, a visit to some of these latrines gives little satisfaction because one finds more excreta round about the latrines than in the latrines themselves. This is not surprising because most of them are used beyond their capacity. The drainage in their neighbourhood is unsatisfactory in as many as 31 of the 36 latrines for which information is available. In the case of the 7 bored-hole and pit latrines the question of removal and disposal of nightsoil does not arise. Of the 31 bucket latrines, 26 have private arrangements for removal and disposal, the faeces being buried in 25 cases and scattered in the field



in one instance. Of the 5 latrines, which are served by public agency the faeces are buried in 3 cases; they are indiscriminately thrown away in one case, and are scattered in the field in the other. On the whole, it may be said that in the private-owned latrines the disposal is satisfactory but the same is not true of those served by public agency. On the other hand, conditions regarding liquid refuse, where it is separately dealt with, is unsatisfactory in 18 instances, and satisfactory in 2 cases. In the other 18 instances the question does not arise either because the liquid excreta finds its way into the bored-holes or the pit, or it is removed in the bucket along with the solid manure.

TABLE XL.

*Latrines, Soil-pollution and Accessibility of Faecal Matter to Flies.*

	Latrines.				Type of latrine.				Soil pollution.				Faecal matter.		
	Provided & used.	Provided but not used.	Not provided.	Total	Bucket.	Pit Latrine.	Boredhole.	Total	Present.	Probable.	Absent.	Total.	Accessible to flies.	Not accessible to flies.	Total.
No. of houses	38	3	548	589	31	1	6	38	115	26	4	145	210	4	214
Percentage	6.5	0.5	93.0		81.5	2.6	15.8		79.3	17.9	2.8		98.1	1.9	

Of the 31 bucket latrines for which this information is available most of them are used beyond their capacity. Thus 4 serve between 4 and 8 persons per seat and 7 others more than 8 persons. Naturally such latrines can hardly be popular. Of the 6 bored-hole latrines, 4 are used by less than 4 persons each, one by more than 4 persons and 1 by more than 8 persons. Only 8 out of the 31 bucket latrines were found clean inside. It is rather disappointing that 5 bored-hole latrines were dirty. Unless the latrines are, or can be, kept clean they would never be popular and the old practice of easing in the fields will continue with justification. How the latrines could be kept clean and by whom is the problem. Could we look up to the training which the children may receive at school, if indeed they do receive it, for the proper use of latrines in future, or there could be some other method of training people? Whatever may be the solution this problem should earnestly engage the attention of the administrator if real advance towards the sanitary control for human faeces has to be made.

**Cattle.**—Over 37 per cent. of houses keep no cattle, 43 per cent. have separate sheds for the animals, 19 per cent. accommodate cattle inside the house and 1 per cent. keep them both inside and outside. About two-thirds of the places where cattle are kept are unsatisfactory as regards cleanliness.

Poultry keeping is not at all popular. As few as 59 households keep the birds, and of these only 7 have controlled runs, in other cases the fowls, etc., go about uncontrolled. Pig keeping is rare; only 3 households keep the animals. They let them go about uncontrolled.

**Fire protection.**—Taking into consideration, the material of which they are made and the water available near at hand, arrangements for fire-protection are inadequate in 78 per cent. fair in 20 per cent. and adequate only in less than 3 per cent. of the house.

## CHAPTER III.

## OUTLINE OF HEALTH INDICES.

Stouman and Falk (1936) have devised an International System of 'Health Indices' with a view to measure the health conditions in a community, to appraise the activities undertaken for the conservation of health of the population and to study the relationship of environmental factors on health. As we have observed before, these indices are not entirely suitable for rural condition in this country. However, we have attempted to follow as far as possible, the outline of indices set out by them. We hope these data will permit some international comparison. In some instances we have taken the liberty to introduce such new information as may be appropriate to this country *e.g.* rates for diseases which are of importance here but of little significance in European countries.

## A. Indices of Vitality and Health.

## 1. Population—

- (1) Last estimate of resident population :—62,700.

Date :—1943.

Source :—Singur Health Unit records.

- (2) Growth of population—

(a) Percentage of annual inter censal increase since 1900 :—Not available.

(b) Natural increase of population since 1930 :—Not available.

(c) School census and others special enumeration :—Total school population is 3,900 (data obtained from Singur Health Centre).

(3) Sex and age distribution of population at last census :—Not available. Instead, the distribution of the same for the sampled population is given below. (All data given hereafter refer to this population unless otherwise stated.)

Sample population :—7,202 (including absentees in 68 villages).

This is made up as follows :—

(a) Residents belonging to the area :—6,984.

(b) Non-residents belonging to the area :—74 (*vide* for explanation key to the General Individual Schedule).

(c) Visitors :—144.

TABLE XLI.

*Age and Sex Distribution of Total Sample Population.*

Ages.	Males.		Females.		Total.	
	No.	P.C.	No.	P.C.	No.	P.C.
Under 5 . . . . .	534	14.4	547	15.7	1,081	15.0
5 to 14 . . . . .	1,042	28.1	870	25.0	1,912	26.0
15 to 24 . . . . .	650	17.7	690	20.0	1,352	18.8
25 to 44 . . . . .	987	26.0	882	25.8	1,809	26.0
45 to 55 . . . . .	254	6.8	214	6.1	408	6.5
55 & Over . . . . .	241	6.5	275	7.9	516	7.2
Total . . . . .	3,714	..	3,484	..	7,198*	..

\* The age distribution of 4 individuals was doubtful, hence excluded.

TABLE XLII.

*Age and Sex Distribution According to Residential Status of Sample Population  
Excluding Visitors.*

Residential status.	Males.					Females.				
	—1	—5	—15	Rest.	Total.	—1	—5	—15	Rest.	Total.
Group I . . . . .	115	356	048	1,003	3,322	132	356	772	1,806	3,066
Group II . . . . .	8	34	75	202	310	10	28	61	178	277
Group III . . . . .	0	1	2	3	6	1	1	7	9	18
Group IV . . . . .	0	1	3	20	24	1	5	8	12	26
Total . . . . .	123	392	1,028	2,128	3,671	144	390	848	2,005	3,387
Percentage distribution . . . . .	3.3	10.7	28.0	58.0	100.0	4.2	11.5	25.0	59.2	100.0

NOTE.—The health indices do not include age and sex distribution according to residential status.

Of the residents 52 per cent. are males and 48 per cent. are females. The disparity between the two sexes is difficult to explain, but it is in conformity with the Bengal experience of 1941 census. Female infants outnumber the male which is probably due to higher mortality rate amongst the latter. Amongst the visitors, the females predominate, being twice the number of the males. This is because, the visitors include married daughters visiting 'their parents' together with their children.

(4) Population by nativity and race :—All Indians.

(5) Women of child bearing age—

(a) Women 15 to 44, in percentage of total population :—22.

(b) Percentage of women, 15 to 44, who are married :—99.

(6) Size of family according to number of children :—Not available.

## II. Natality—

(1) Marriages per 1,000 population :—Not available.

(2) Natality and fertility—

(a) Live births per 1,000 population during the year 1943 :—42.6.

(b) Live births per 1,000 women of ages 15 to 44 :—195.

(c) Legitimate live births per 1,000 married women 15 to 44 :—197.

(d) Illegitimate live births per 1,000 unmarried women 15 to 44 :—None.

(e) Gross Reproduction Rate :—2.94.

(f) Net Reproduction Rate :—1.13.

## III. Still-births, Infants and Maternal mortality—

(1) Still-births per 1,000 total births :—32. Neonatal mortality (under 1 month) per 1,000 live births :—75. Later infant mortality (1-12 months) per 1,000 live births :—62.

(2) Causes of still-births and infant mortality—

(a) Causes of still-births per 1,000 total births. Prematurity :—15.

(b) Causes of infant mortality per 1,000 live births. (See Table XLIII).

TABLE XLIII.

*Infant Mortality by Causes.*

	Under 1 month.		1—12 months.		Total.	
	Numbers.	Rate.	Numbers.	Rate.	Numbers.	Rate.
Asphyxia Neonatorum . . . . .	3	10	0	0	3	10
Congenital debility & malformation . . . . .	1	3	0	0	1	3
Cholera . . . . .	0	0	1	3	1	3
Diarrhoea and dysentery . . . . .	1	3	5	16	6	20
Other fevers . . . . .	1	3	3	10	4	13
Malaria . . . . .	1	3	2	7	3	10
Miscellaneous . . . . .	4	13	6	20	10	33
Prematurity . . . . .	0	29	0	0	0	29
Tetanus . . . . .	3	10	0	0	3	10
Typhoid and paratyphoid . . . . .	0	0	2	7	2	7
Total . . . . .	23	75	10	62	42	137

(3) Miscarriages, still-births, and neonatal mortality among cases under prenatal care—

(a) Miscarriages per 1,000 cases under prenatal care :—There were no miscarriages among the 46 deliveries for which antenatal care was not considered adequate according to the definition adopted.

(b) Still-births per 1,000 total births :—None in the above cases.

(c) Neonatal deaths per 1,000 live births—65·2.

(4) Maternal mortality per 1000 total births :—

Eclampsia :—3·1.

Unknown or ill defined :—9·5.

Total :—12·6.

(5) Mortality due to abortions per 1,000 total births :—None.

#### IV. General mortality and cause of death—

1. General death rate for 1,000 population (corrected for residence) :—23·7.

2. Standardised death rate (on the basis of Bengal Population) :—20·8.

3. Specific death rates by sex and age :

TABLE XLIV.

*Specific Death Rates by Sex and Age.*

Ages.	Males.			Females.			Total.		
	No. of deaths.	No. of people.	Rate.	No. of deaths.	No. of people.	Rate.	No. of deaths.	No. of people.	Rate.
1—4 . . .	21	103	32	11	308	25	32	790	40
5—14 . . .	4	1,012	4	6	870	7	10	1,012	5
15—24 . . .	8	656	12	8	696	11	16	1,352	12
25—44 . . .	17	987	17	9	813	11	26	1,800	14
45—64 . . .	9	254	35	1	214	5	10	469	21
55— . . .	19	211	79	12	275	44	31	516	60

4. Principal causes of death per 100,000 inhabitants :

TABLE XLV(a).

*Principal Causes of Death per 100,000 Inhabitants—MALE.*

Diseases/age	1—4	5—14	15—24	25—54	55+	Total.
Malaria . . . . .	1,737	96	152	322	2,490	565
Dysentery & diarrhoea . . . .	1,241	96	152	242	415	404
Cholera . . . . .	248	0	305	161	415	189
Other fevers . . . . .	496	96	0	0	0	102
Pneumonia . . . . .	0	0	152	161	1,245	162
Typhoid and paratyphoid . . .	496	0	0	81	0	106

TABLE XLV(b).

*Principal Causes of Death per 100,000 Inhabitants—FEMALE.*

Diseases/age.	1—4	5—14	15—24	25—54	55+	Total.
Malaria . . . . .	753	345	144	276	727	373
Diarrhoea & Dysentery . . . .	758	115	144	184	364	287
Cholera . . . . .	758	0	144	12	0	144
Other fevers . . . . .	253	0	0	0	364	88
Child birth . . . . .	0	0	431	92	0	115

## V. Morbidity—

### 1. Epidemic diseases\*—

#### (a) Cases per 100,000 population.—

(a) Typhoid and paratyphoid fevers . . . . .	626
(b) Diphtheria . . . . .	15
(c) Scarlet fever . . . . .	Nil.
(d) Cataract . . . . .	61
(e) Chicken pox . . . . .	244
(f) Cholera . . . . .	336
(g) Diarrhoea and dysentery . . . . .	3,770
(h) Ear disease . . . . .	76
(i) Fevers, others . . . . .	1,359
(j) Influenza . . . . .	580
(k) Leprosy . . . . .	92
(l) Malaria . . . . .	25,889
(m) Measles . . . . .	4,167
(n) Miscellaneous . . . . .	2,641
(o) Mumps . . . . .	61
(p) Pneumonia (influenza & pneumonia) . . . . .	580
(q) Puerperal fever . . . . .	107
(r) Rheumatic fever . . . . .	183
(s) Scabies . . . . .	122
(t) Skin and other diseases . . . . .	244
(u) Tuberculosis of the respiratory system . . . . .	107
(v) Venereal disease . . . . .	107
(w) Heart disease . . . . .	76
(x) Liver disease . . . . .	76
(y) Nephritis and other disease . . . . .	92
(z) Nervous disease . . . . .	61
(1) Smallpox . . . . .	122
(2) Asthma . . . . .	290

\* NOTE.—Except cholera and smallpox—cases are not notified but the information is based on data obtained during the survey for 1943.

#### (b) Case-rates per 10,000 population at each age group :—

TABLE XLVI.

#### Case Rates for Principal Diseases per 10,000 Population by Age Group.

Diseases.	Under 1		1—4		5—14		15 & above.		Total.	
	No.	Rates.	No.	Rates.	No.	Rates.	No.	Rates.	No.	Rates.
Malaria . . . . .	11	418	100	2,500	550	3,171	936	2,467	1,606	2,580
Diarrhoea and dysentery.	10	722	51	698	41	283	186	358	247	377
Pneumonia . . . . .	1	38	5	68	5	28	28	74	39	60
Influenza . . . . .	1	38	2	27	11	62	25	66	39	60
Measles . . . . .	17	646	106	1,450	128	726	22	58	273	417
Cholera . . . . .	0	0	2	27	8	45	12	32	22	34

NOTE.—Diphtheria, scarlet fever and acute poliomyelitis mentioned in the list are not diseases of local importance.

(c) Case-mortality rates per 100 cases :—

TABLE XLVII.

*Case-mortality Rates for Principal Diseases per 100 Cases by Age Group.*

Disease.	Under 1	1—4	5—14	15 & above.	Total.
Malaria . . . . .	21.4	5.0	0.7	1.8	2.0
Diarrhoea and dysentery . . . .	24.0	13.6	4.0	6.2	9.2
Pneumonia . . . . .	0	0	0	20.0	18.0
Influenza . . . . .	0	0	0	0	0
Measles . . . . .	0	0	0	0	0
Cholera . . . . .	100.0	66.7	0.0	30.0	38.7

2. Venereal diseases :—No information.

3. Tuberculosis :—No notification arranged and register not kept.

4. Occupational diseases :—Does not arise.

5. General morbidity (from Health Insurance data) :—See V 1 (a).

6. Results of school medical examination :—Percentage of school children examined found affected.\*

Organ or defect	Percentage.	Organ or defect.	Percentage.
Defective sight . . . . .	1.0	Heart disease . . . . .	0.3
Defective hearing . . . . .	0.5	Pulmonary disease . . . . .	0.3
Defective teeth . . . . .	3.3	Undernourishment . . . . .	48.1
Diseased tonsils . . . . .	37.0	Pediculosis . . . . .	30.7
Enlarged glands . . . . .	29.5	Posture and light during reading and writing.	85.1

\* See table OLXXX, Chapter XI, for corresponding data obtained by School Health Service.

## VI. Invalidity—

Incidence by sex and age :

(1) Persons in receipt of invalidity pension :—Does not arise.

(2) Principal causes of invalidity (From Insurance data) Rate per 10,000 insured at each age :—No information.

(3) Physical defects :—Rate per 10,000.

TABLE XLVIII(a).

*Physical Defects by Age Group—Rate per 10,000—MALE.*

	Under 15	15—24	25—44	45—55	55+
Partially deaf . . . . .	25	15	101	118	207
Completely deaf . . . . .	0	0	0	0	0
Deaf mute . . . . .	19	0	0	0	0
Partially blind . . . . .	10	0	51	157	209
Completely blind . . . . .	0	0	0	39	41
Loss of limb . . . . .	25	30	91	79	207

TABLE XLVIII(b).

*Physical Defects by Age Groups—Rate per 10,000—FEMALE.*

	Under 15	15—24	25—44	45—55	55+
Partially deaf . . . . .	14	0	0	140	255
Completely deaf . . . . .	0	0	0	0	36
Deaf mute . . . . .	0	0	11	0	0
Partially blind . . . . .	21	0	23	0	218
Completely blind . . . . .	0	0	11	0	145
Loss of limb . . . . .	21	0	11	47	145

VII. *Insanity and Mental Defects* :—No information.VIII. *Alcoholism and Drug Habit*—

Rates per 10,000 inhabitants.

	Male	Female
Alcohol . . . . .	3,300	0
Opium . . . . .	1,700	1,300

IX. *Accidents*—

(1) Reported under the Workmen's Compensation Law :—Does not arise.

(2) Automobile accidents :—No information.

X. *Suicides and Homicides*—

Suicides—

(1) Deaths per 100,000 inhabitants :—16. (Data obtained from choulkidars' Return.)

Homicides—

(2) Deaths per 100,000 inhabitants :—Nil.

XI. *Examination of Physical Fitness*—

(1) Examination for military conscription :—Does not arise.

(2) Examination for insurance :—No information.

(3) Other physical examinations :—Not done.



## B. Indices of Environment.

### I. Climate—

#### (1) Temperature—

(a) Mean annual :—74.9°F.

(b) Highest and lowest monthly mean :—96.7°F. and 52.9°F.

#### (2) Rainfall—

(a) Annual :—64.2" (For 1943).

(b) Seasonal maximum :—17.7" (July).

#### (3) Relative humidity—

(a) Mean annual :—80 per cent.

#### (4) Hours of sunshine :—No information.

#### (5) Velocity of wind—

(a) Mean annual :—No information.

### II. Topography and Density of Population—

(1) Mean altitude above sea level :—30 ft.

(2) Distance from salt water :—7 miles (from tidal river).

(3) Nature of soil and subsoil :—Alluvial (clayey and sandy).

(4) Density of population per square mile of population :—1,900.

### III. Social and Occupational Distribution of Population—

#### (1) Percentage distribution of occupied population :—

(a) Percentage of population over 15 of each sex engaged in gainful occupation (not women at own housework) :—Males 93.5, Females 4.5.

(b) Percentage of families having home-maker (wife), gainfully employed :—7.

(c) Percentage of children of 14 or 15 gainfully employed :—38.9.

(d) Percentage distribution of gainfully occupied persons for each sex :—  
See (Table XLIX) below.

TABLE XLIX.

*Percentage Distribution of Sample Population According to Occupation and Sex.*

Occupation.	Males.		Females.	
	No.	P. C.	No.	P. C.
Liberal profession . . . . .	43	2.3	0	0
Landlord . . . . .	7	0.4	2	2.3
Shopkeeper . . . . .	136	7.2	4	4.7
Artisan . . . . .	34	1.8	0	0
Cultivator . . . . .	1,176	61.9	0	0
Transport labour . . . . .	8	0.4	0	0
Industrial . . . . .	109	5.7	15	17.4
Others . . . . .	387	20.4	65	75.6
Total . . . . .	1,900	..	86	..

The rest are either at home or at School.

#### IV. Cultural level—

(1) Percentage of illiteracy over 10 years of age :—75·7.

(2) School attendance per 100 children of each age :—

7 to 13 years inclusive . . . . .	23·8
14 to 15 years inclusive . . . . .	15·2
16 and 17 years inclusive . . . . .	7·8
18 to 20 years inclusive . . . . .	2·8

(3) Newspaper circulation per 100 inhabitants :—No information.

(4) Volumes in public libraries per 100 inhabitants :—No information.

#### V. (1) Population distribution by income classes :—Not worked out.

Instead, the distribution of the sub-sampled population by average annual expenditure on consumption *per capita* is given below (Table L).

TABLE L.

#### *Average Annual Expenditure Per Capita on Consumption Side.*

—	—100 Rs.	—150 Rs.	—200 Rs.	—250 Rs.	Rs. 250 +
No. of families . . . . .	55	185	153	74	45
Percentage . . . . .	10·7	36·1	29·0	14·5	8·8

(2) Distribution of homes by ownership or rentals :—No information.

#### VI. *Illegitimacy and Prostitution—*

(1) Percentage of illegitimate births :—*Nil*.

(2) Measures for abolition or control of prostitution :—*Nil*.

#### VII. *Housing—*

(1) Nature of available housing.

Percentage distribution of houses by type :—

One family house :—80·5.

Two family houses :—11·7.

Three or more family houses :—7·8.

(2) Density of inhabitants per room :—No information.

Instead, distribution of houses by floor area is given below :—

	No.	P.C.
—36 sq. ft. per head . . . . .	305	67·2
36— sq. ft. per head . . . . .	155	28·4
42— sq. ft. per head . . . . .	21	3·6
50— sq. ft. per head . . . . .	17	2·9

(3) Over-crowded dwellings :—See VII (2).

(4) Percentages of dwellings provided with separate water closet :—*Nil*.

(5) Percentage of dwellings provided with individual bathrooms :—

Instead percentage of dwellings with private facilities for washing and bathing :—6.6.

(6) Percentage of dwellings provided with central heating :—*Nil*.

(7) Percentage of dark and semi-dark rooms (not counting bath-rooms) :—

16.4.

(8) Percentage of house partly or wholly below street level :—*Nil*.

(9) Percentage of population living in :—

(a) Hotels :—*Nil*.

(b) Lodging houses :—*Nil*.

(c) Institutions :—*Nil*.

(10) Percentage of dwellings constructed since 1920 :—No information.

(11) Population of city area which is not built up :—Does not arise.

#### VIII. Nutrition—

(1) Consumption *per capita* of certain articles of food (per day)—

(a) Cereal products :—18 oz.

(b) Meat, poultry, eggs and fish :—1.44 oz.

(c) Milk and milk products :—1.44 oz.

(d) Vegetables and fruits :—7 oz.

(e) Sugar, fats and others :—0.96 oz.

(2) Percentage of School children found under-nourished :—48.1.

(3) Other available indices of under nourishment :—For the whole sampled population 43.2 per cent. are under-nourished.

*Per capita* consumption of alcoholic beverages, tobacco and narcotics :—Not available.

#### C. Indices of Administrative Activity.

These data relate to the whole of the present Health Centre Area for 1943, only a part of which was included in the old Health Unit Administration

##### I. Community expenditure on sickness and Public Health—

(1) Expenditure, actual and per 1,000 inhabitants

(a) On public health :—Rs. 25,000 (Singur and Balarambati).

Rs. 28,000 (For all the 4 Union Boards).

*For 1,000 population.*

Rs. 926 for Singur and Balarambati.

Rs. 447 for all Union Boards.

(b) On medical care :—Rs. 8,832 (Actual) Rs. 141-11-0 for 1,000 population.

(c) Industrial hygiene :—*Nil*.

(d) Sewage and Refuse disposal :—*Nil*.

(e) Other items :—No information.

(f) Capital expenditure :—*Nil*.

## II. Health personnel—

### (1) In community service :—

#### (a) Public health work :—

Physicians :—1 M.O.H.+1 A.M.O.H. ((Lady doctor).

Dentists :—*Nil*.

Nurses :—3 (Health Visitors).

Inspectors, etc. :—2.

Other personnel :—1 Malaria Supervisor.

Other professional :—4 (Midwives).

#### (b) In hospitals and similar institutions :—

Physicians :—4.

Pharmacists :—4 (Compounders).

Nurses :—2.

Other professional :—1 (Dresser).

### (2) Total of persons exercising health professions :—

	Numbers.	Rate per 10,000 .
Physicians (qualified) . . . . .	9	1.5
Dentists . . . . .	<i>Nil</i> .	0.0
Pharmacists (Compounders) . . . . .	8	1.3
Nurses (Health Visitor) . . . . .	3	0.5
Midwives (trained) . . . . .	4	0.6
Dais (trained) . . . . .	18	2.9
Other professional—		
Unqualified doctor . . . . .	48	7.6
Untrained dais . . . . .	17	2.7

### (3) Qualifications of Health Officer :—M.B., D.P.H.

## III. Vital Statistics—

### (1) Correction for residence :—

(a) Are births, still-births and deaths of non-residents and particularly those occurring in hospitals and other institutions excluded from the statistics ?—Yes.

(b) Are reports of all births, still-births and deaths of residents occurring elsewhere regularly received and included in the statistics ?—No.

### (2) Verification of certificates :—

(a) Is the registration of births, still-births and deaths compulsory and within what time-limits ?—Yes—Within 8 days next after a birth or death.

(b) Is the issuing of a burial permit dependent upon registration ?—No.

(c) Are the certificates systematically checked for completeness and reconciled before being filed ?—Does not arise.

(d) Are deaths under 1 year checked against birth certificates ?—Does not arise.

(e) Are deaths from notifiable diseases checked against case reports ?—No.

## (3) Verification and tabulation of cause of death :—

- (a) Percentage of deaths medically certified:—Does not arise.
- (b) Percentage of deaths in case of which an autopsy was made :—*Nil*.
- (c) Is the medical statement of cause of death confidential ?—No.
- (d) Is an enquiry made into all causes of death insufficiently specified ?—  
No (except in medicolegal cases).
- (e) Percentage of deaths appearing in the statistics as unknown or ill-defined :—16.3 per cent. recorded as ' all other causes. '
- (f) Percentage of deaths over 65 appearing in the Statistics as due to senility—*Nil*.
- (g) Are the deaths classified by cause according to the detailed International List of causes of Death—No.
- (h) Are cause of death tabulated by age for each sex ?—Yes.
- (i) Are the cause of infant death tabulated separately for the first month of life ?—Yes.

## (4) Reports and Graphs :—

- (a) Are annual reports over births, deaths, infant mortality and causes of death issued ?—Yes.
- (b) Do these reports contain an analysis review ?—No.
- (c) Are monthly or weekly reports issued ?—No.
- (d) Are graphs prepared showing the current trend of more important indices ?—Yes.

## (5) Population records :—

- (a) What is the inter-censal interval ?—10 years.
- (b) Is a population register kept ?—No.
- (c) What other complete or partial enumerations have been made ?  
Families with distribution of adults and children and sex, were enumerated.

## IV. Laboratory services—

## (1) Examinations of specimens of human origin :—

- (a) Bacteriological examinations :—  
Specimens examined—*Nil* (but introduced in 1944).  
Examinations per case notified—Does not arise.
- (b) Other examinations :—Blood and urine :—126.

## (2) Milk and cream analysis :—

Specimens examined :—Two samples of milk.

## (3) Examinations of other articles of food or drink :—

Cow ghee 7, Buffalo ghee 4, mustard oil 36, Atta 8, Tea 3.

## (4) Water analysis :—

- (a) Public water supply :—26.
- (b) Other drinking water :—*Nil*.
- (c) Other water :—*Nil*.

(5) Tests of vaccines, sera and other therapeutical products :—*Nil*.

(6) Total Laboratory activity :—

Total examinations :—No. per 1,000 inhabitants :—4.0.

## V. *Acute Communicable Diseases*—

### 1. Notification.

Cholera and smallpox only are notifiable diseases also Typhoid—(48 cases reported).

(2) Case investigation and recording :—*Nil*.

(3) Hospitalisation.

Percentage of notified cases investigated within 24 hours :—*Nil*.

(4) Control of contacts.

Contacts controlled (Bacterial examinations, quarantine, etc.) for each case notified :—*Nil*.

(5) Control of carriers :—*Nil*.

(6) Diagnostic service :—*Nil* (but introduced in 1944.)

(7) Visits to cases :—

Number of visits by health department and visiting nurses association nurses or physicians to non-hospitalised cases of :—*Nil*.

(8) Immunisation.

(a) Number of immunisations performed—

Smallpox	.	.	.	.	.	.	.	.	.	.	.	2,237
Cholera	.	.	.	.	.	.	.	.	.	.	.	2,842
Typhoid	.	.	.	.	.	.	.	.	.	.	.	744

(b) Percentage of school children vaccinated against smallpox :—99 per cent.

(c) Percentage of children immunised against diphtheria :—*Nil*.

## VI. *Venereal diseases*—

(1) Case reporting :—*Nil*.

(2) Treatment of cases :—

Activity of public clinics :—No clinics specially for V. D.

No. of clinics :—*Nil*.

No. of inhabitants per clinic :—Does not arise.

No. of clinic sessions per clinic :—Does not arise.

(3) Control practices :—

(a) Percentage of cases reported to have discontinued treatment before cured :—

By clinics :—Does not arise.

By practising physicians :—No information.

Percentage of such cases subsequently returned and treated :—Does not arise.

Cases inturred for treatment :—*Nil*.

(b) Probable sources of infection examined :—Does not arise.

(4) Early detection and trend of Syphilis :—Does not arise.

## VII. Tuberculosis—

1. Tuberculosis register :—No register is kept.

2. Clinical service :—There is no special clinic but cases are treated in outdoor dispensaries.

3. Field nursing service :—*Nil.*

4. Institutional care.

(a) Facilities and treatments :—

	Number.
Tuberculosis hospitals . . . . .	<i>Nil.</i>
Tuberculosis wards in general hospitals . . . . .	<i>Nil.</i>
Sanatoria . . . . .	<i>Nil.</i>
Institutions for surgical tuberculosis . . . . .	<i>Nil.</i>
Prevention . . . . .	<i>Nil.</i>
Private Institutions . . . . .	<i>Nil.</i>

Other Institutions—45 cases (treated in outdoor dispensaries).

(b) Special measures for children :—*Nil.*

(c) Percentage of tuberculosis deaths occurring in institutions :—Does not arise.

(d) Treatment by collapse therapy :—Does not arise.

## VIII. Other diseases—

	Cancer.	Heart disease.	Pneumonia.	Other diseases.			
				Malaria.	Diarrhoea & Dysentery.	Cholera.	Typhoid & Paratyphoid.
Diagnostic service . . . . .	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>
Nursing care . . . . .	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>
Number of cases hospitalised.	<i>Nil.</i>	<i>Nil.</i>	9	13	18	<i>Nil.</i>	9

## IX. General Public Health Nursing :—*Nil.*

## X. Maternity Hygiene—

1. Prenatal care :—

(a) Number of prospective mothers receiving home nursing supervision :—1,325.

Rate :—Per 100 total births :—69.5.

(b) Number of nursing visits to home :—3,114. (Prenatal visits by midwives, 5,624).

(c) No. of prenatal consultations, visits or conferences per case registered with Health Unit :—2.6.

(d) Percentage of prenatal cases in which Urine specimens were analysed.—45.

2. Measures concerning pregnant women working in factories :—

(a) Is legislation covering this field in force ? Yes.

(b) Period during which factory work is forbidden :

Before probable date of delivery . . . . . 4 weeks.

After delivery . . . . . 4 weeks.

(c) Is pecuniary assistance legally assured during this period, how much and by whom?—Yes. One days' wages or 8 annas per day which ever is greater—paid by the employer.

### 3. Obstetrical service :—

#### (a) Place of delivery and attendance :\*

	In Maternity Home	In home assisted by		
		Others	Physician.	Midwife.
Total births . . . . .	2.8 per cent.	not known		30.7 Per cent.

\* Cf. Statement on page 103 for sample population.

(b) Must all midwives be registered by Health department and what training is required to obtain certificate?—Registration is compulsory for those who seek employment under government but only obligatory for others.

Period of training :— (i) For a trained nurse :—12 months.

(ii) For untrained :—18 months.

#### (c) Maternal mortality according to attendance :—

Maternal deaths per 1,000 deliveries occurring in Maternity Hospitals or Wards :—Nil.

Private lying in clinics :—Does not arise.

Home, attended by—

Obstetrician . . . . .	} No information. Total maternal deaths = 10 (Rate : 5 per 1,000 births).
Other Physician . . . . .	
Midwife . . . . .	
Relatives or Dais . . . . .	

### 4. Post-partum care :—

(a) Average days of stay after delivery in maternity hospital or ward :  
Normal cases—10 days.

(b) Nursing service :—(by midwives).

Case visited.	Percentage of all births.	Visits per case.
585	30.7	6.2

(c) Percentage of cases having had post-partum examination :—4.

## XI. Infant and Pre-school Hygiene—

### 1. Clinics and medical care :

#### (a) Infants (under 1 year).

Regd-tered with.	Number of clinics.	No. of Infants.	P. C. of live Births.	No. of visits.	Visits per infant.	Examination by physician in P.C. of visits.
Health Dept. clinics . . . . .	236	100	9.0	603	3.6	No information.
Other public agencies . . . . .	} nil.					
Voluntary agencies . . . . .						



## (b) Children from 1 to 5 years of age :—

Registered with.	No. of clinics.	No. of children.	P. C. of population.	No. of visits.	Visits per child.	Examination by physician in P. C. of visits.
Health Dept. clinics	230	189	3.2	709	3.8	No information.
Other public agencies	} Nil.					
Voluntary agencies						

## 2. Nursing service :

## (a) Infants (under 1 year).

Nurses of	Number of infants registered.	In P. C. of live births.	Number of home visits.	Visits per infant.
Health Dept.	1,310	70.0	3,622	2.8
Other public agencies	} Nil.			
Voluntary agencies				

## (b) Children from 1 to 5 years of age :—

Nurses of	Number of children registered.	In P. C. of population 1—5.	Number of home visits.	Visits per child.
Health department	1,090	118.7	3,043	2.8
Other public agencies	} Nil			
Voluntary agencies				

## 3. Provision of special milk for infants :—Nil.

## 4. Supervision of illegitimate, boarded-out and neglected infants and children :—Nil.

## 5. Pre-school round-up :

Percentage of children medically examined within six months previous to entering school or kindergarten :—Nil.

## XII. School Hygiene—

## 1. Number of schools by category and number of pupils per school in each category of school :—

(a) Public schools :—48.

(b) Private and parochial schools :—1 Missionary school.

## 2. Inspection and condition of school premises :—

(a) Machinery for inspection :—Inspector of schools.

(b) Standards in force as to construction :—Nil.

(c) Supervision of other regulations :—Nil.

## 3. Provision for defective, weak or backward children :—Nil.

#### 4. Health examinations :—

(a) Percentage of school-children examined :—

	1, 4 & 7th standard.
By physician . . . . .	81.7
By nurse (for vision or hearing) . . . . .	<i>Nil.</i>
By dentist . . . . .	<i>Nil.</i>

(b) Average time given to each child at medical examination :—10 minutes.

(c) Is action taken systematically by school to follow up defects discovered until necessary attention has been given ?—No.

(d) Scope of examinations and corrections of defects (see under A, V, 6) meagre.

(e) Are health examinations compulsory also in private, parochial and high schools ?—No.

#### 5. Observation and care of children :—

(a) Is health of children observed in school by nurse and teacher ?—No.  
(observation by teachers introduced in 1944).

(b) Is free medical attention assured by children ?—No.

By school health insurance :—No.

By public clinics :—No.

Otherwise :—No.

(c) Number of school nurses per 10,000 school-children :—*Nil.*

Number of visits to homes by school nurses per 10,000 school children :—*Nil.*

Percentage of home visited :—*Nil.*

#### 6. Recreation and physical training :—

(a) Percentage of schools having a gymnasium : (poorly equipped).  
Public schools :—6.

Private and parochial schools :—*Nil.*

(b) Number of hours of physical exercise per week in school curriculum  
—1 hour.

(c) Is a fair proportion of these hours devoted to outdoor sports ?—No  
(but facilities for outdoor sports are usually provided).

(d) Are ample facilities available for shower baths ?—No.

(e) Playground area per 1,00 children—1,000 sq. yds.

#### 7. School kitchens and meals at school :—

(a) Do children in public schools receive free meals :  
 All children  
 Those who wish it  
 Those who are judged to be in need of it  
 Milk only

} *Nil.*

(b) Do the girls learn cooking under competent instructions ?—No.

Does the school-kitchen instruction include simple elements of theory of nutrition ?—Does not arise.

In what grades is school kitchen instruction given ?—Does not arise.

8. Provision for summer holidays :—

(a) Is provision made for summer camps out of town ?—No.

(b) Are sanitary conditions of camps inspected ?—Does not arise.

(c) Other provisions for boarding children out of town :—*Nil*.

(d) Percentage of public school children sent out of town in summer :—*Nil*.

### XIII. Physical education outside schools (not including Military, Pre-military or Para-military training or Units belonging to Political Organisation).—

1. Physical education supervised by :—

	No. of active members.
Public institutions . . . . .	<i>Nil</i> .
Scout movement . . . . .	<i>Nil</i> .
Other voluntary agencies . . . . .	<i>Nil</i> .

2. Gymnasiums and swimming-pools (not school) :—

	Gymnasiums.	Swimming pools.
Public . . . . .	<i>Nil</i> .	<i>Nil</i> .
Voluntary agencies . . . . .	<i>Nil</i> .	<i>Nil</i> .
Commercial . . . . .	<i>Nil</i> .	<i>Nil</i> .

3. Playgrounds (area per 1,000 children) :—

Public :—*Nil*.

Voluntary agencies :—3 playgrounds, one each at Singur, Bora & Balarambati.

### XIV. General Sanitation.—

1. Water supply—

(a) Source of village water supply :—tubewell (298 public tube wells).

(b) Treatment of water :—*Nil*.

(c) Number of other supplies :—56 surface wells but only 10 are used for drinking.

(d) Percentage of dwellings connected with municipal water supply :—Does not arise.

(e) Abolition of cross-connections :—Does not arise.

(f) Consumption of water *per capita* :—Not estimated.

(g) Frequency of bacterial analysis :—

Deep-well supplies :  
Surface supplies :  
} *Nil*.

(h) Percentage of samples, meeting standard requirements :—Does not arise.

## 2. Sewage and refuse disposal—

- (a) Treatment and disposal of sewage :—No arrangement by the health authorities.
- (b) Treatment and disposal of other refuse :— — Do. —
- (c) Eventual nuisances arising from sewage and refuse disposal :—Increased fly breeding.
- (d) Percentage of dwellings connected with street sewers :—Does not arise.
- (e) Percentage of dwellings in which individual W. C. is installed, *nil* but 6.5 per cent of houses are provided with latrines.
- (f) Percentage of privies in other dwellings which meet sanitary requirements :—*Nil*.
- ## 3. Swimming-pools and public baths :—*Nil*.
- ## 4. Other general sanitation.

Inspections concerning	Inspections.	Notices served or action taken.
Pollution of streams . . . . .	<i>Nil</i> .	4 eliminated.
Mosquito breeding places . . . . .	615	
Camp sites . . . . .	<i>Nil</i> .	
Smoke nuisance . . . . .	<i>Nil</i> .	
Noise . . . . .	<i>Nil</i> .	
Other unsanitary conditions . . . . .	<i>Nil</i> .	

## XV. Food and Milk Inspection.—

### 1. Meat inspection :—

- (a) Is all slaughtering limited to regularly inspected slaughter houses :—No.
- (b) Is all meat regularly inspected and by whom ?—No.
- (c) Is all sale meat and meat products limited to regularly inspected shops ?—Yes (not regularly).
- (d) Are regulations concerning the protection of the meat and meat products in the shops enforced ?—Yes (not regularly).
- (e) Are cold-storage rooms inspected ?—Does not arise.

### 2. Milk control (see C, IV, 2).

- (a) Control of sources of milk supply :—

	Collecting stations.	Farmers shipping separately.
Number of separate establishments . . . . .	<i>Nil</i> .	<i>Nil</i> .
Amount of raw milk to consumer . . . . .		No information.
Amount of pasteurised milk . . . . .	<i>Nil</i> .	
Percentage of milk bottled . . . . .	<i>Nil</i> .	
Number of samples taken for test . . . . .	2	
Percentage of samples up to standard . . . . .	50	

XIX. *Care of the insane and Feeble-minded.*—No provision.

XX. *Hospital Facilities.*—

Category.	No. of institutions.			No. of beds.			Total beds per 10,000 population.	Days of treatment per completed case.
	Pub.	Volun.	Priv.	Pub.	Volun.	Priv.		
Isolated hospital or wards.	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	Does not arise.
General hospitals.	1	<i>Nil.</i>	<i>Nil.</i>	18	<i>Nil.</i>	<i>Nil.</i>	4	Not available.
Children's hospitals	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	Does not arise.
Maternity hospitals	1	<i>Nil.</i>	<i>Nil.</i>	4	<i>Nil.</i>	<i>Nil.</i>	1	10 days.
Other similar institutions.	3 outdoor dispensaries.			<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	<i>Nil.</i>	Does not arise.

XXI. *Health Insurance.*—*Nil.*

XXII. *Free Medical Assistance.*—Yes.

Number of persons having received gratuitous medical assistance in the form of :—

(a) From public services :—

On account of.	Clinics & medicine.	Other medical	Dentist.	Nursing.	Institutional care.	Medicine.	Other Assistance.
Epidemic disease .	..	..	..	..	..	..	..
Venereal disease .	..	..	..	..	..	..	..
Tuberculosis .	..	..	..	..	..	..	..
Other diseases .	17600 per year.		..	..	77	..	32
Accidents .	..	..	..	..	..	..	..
Delivery .	..	..	..	..	51	..	1325 (Incurable visits).

(b) From voluntary agencies :—*Nil.*

XXIII. *Invalidity care* :—*Nil.*

XXIV. *Care of the Aged* :—*Nil.*

## CHAPTER IV.

## ANTHROPOMETRY.

## Age, sex and weight.

The average weight of male and female infants is practically the same, being a little over 13 pounds (*vide* Table LIV and chart 4). Later the age-weight curves of the two sexes run more or less parallel—the female child being a pound or so lighter than the male child upto the age of 8 years. Between 8 and 9 years the female curve crosses over the male curve and between 10 and 11 years there is a difference of 5 pounds between the two sexes. Next year the male curve recrosses the female curve and between 12 and 13 years the girls are about 5 pounds lighter. However, between 13 and 14 years the average weight of the female child increases rapidly and she out-weighs the male child by about 5 pounds during this period. She keeps up the superiority upto 16th year, but in the 17th year the male child catches her up and weighs about two and a half pounds more than her between 17th and 18th year. The girl ceases to grow between 19 and 20 years, but the boy continues to add to his weight for another couple of years. Thenceforth the average difference between men and women is about 15 pounds. Women decline in weight after 45 years, but no such change takes place in men. The difference in weight noticed at the age period 9 and 11 years between girls and boys may be partially due to an error in the estimate of age of the boys, because the height curves shows a drop between 9 and 10 years, which is unlikely. On the other hand, it may be in part physiological as it has been observed in other countries at the age of 12. The physiological changes occur a year or more earlier in Bengal as compared with western countries. Compared to American records (Davison, 1940) Singur data show an initial disadvantage of about 4 pounds between 0 to 1 year. Or to put it differently by the end of first year of life the American baby has already stolen a march equivalent to one year over his brother or sister in Singur. This divergence steadily increases till between 16 and 17 years, the Singur child shows a lag of about three and a half years. We may now compare our experience with other Indian data. The records of boys and girls of 10 to 16 years living in certain residential institutions in South India (Aykroyd and Krishnan, 1937) show that while in the age period 10 to 12 the boys weigh more than the girls; at the thirteenth year the girls outweigh the boys by nearly three pounds. In the 14th year the boys weigh more but in the next year the girls again outweigh the boys. From the 16th year onwards the boys maintain higher weights. As with Singur data, the curves for males and females cross each other twice. However, the points at which they do so in Singur are the 9th year, 12th year, 14th year and the 16th year instead of 13th, 14th, 15th and 16th years as in South India.

## Growth.

According to Singur experience the comparison between the curves of increment in weight with age of the two sexes brings out certain points (*vide* Table LIV). The maximum growth for the male child is in the age period 11 to 13 years and again between 15 and 17 years. For the female child the two periods of maximum growth are between 8 and 10 years and again between 13 and 16 years. After the age of 18 years there is but little change in the

average weight of women but in the case of men the average weight continues to increase steadily upto the age of 22 years.

TABLE LIV.

*Average Weight According to Age and Sex for Various Populations.*

Age.	MALE.						
	Singur.	Residential Institutions in South India.	Families of Industrial coolies workers in Assam.	Well to do families from Calcutta.	Bengal students.	Poor class Bengal Hindus.	Normal American.
—1	13.1	..	..	..	..	..	17.0
—2	17.3	..	..	..	..	..	24.4
—3	19.0	..	..	..	..	..	29.1
—4	23.0	..	..	..	..	..	34.2
—5	26.6	..	..	..	..	..	36.0*
—6	30.2	..	..	..	..	..	41.2
—7	33.1	..	34.8	47.7	..	..	45.1
—8	36.3	..	41.3	50.2	48.0	39.10	49.5
—9	38.6	..	44.5	56.2	49.0	43.45	54.5
—10	41.3	..	47.2	58.3	53.0	46.34	60.0
—11	43.7	55.02	50.6	63.1	58.7	50.20	66.6
—12	52.0	58.00	57.8	75.2	65.1	56.23	72.1
—13	61.1	60.66	..	..	70.2	64.30	79.8
—14	62.6	70.00	..	..	78.5	..	82.5
—15	66.0	81.06	..	..	86.0	..	90.0
—16	77.9	81.00	..	..	93.1	..	..
—17	81.3	95.25	..	..	107.6	..	..
—18	88.3	100.46	..	..	110.0	..	..
—19	92.8	..	..	..	112.0	..	..
—20	94.3	..	..	..	112.0	..	..
—21	94.6	..	..	..	114.4	..	..
—22	100.3	..	..	..	116.5	..	..
—23	97.9	..	..	..	116.0	..	..
—24	97.2	..	..	..	114.4	..	..
—25	99.5	..	..	..	117.7	..	..
—26	97.8	..	..	..	..	..	..
—27	103.7	..	..	..	..	..	..
—28	95.5	..	..	..	..	..	..
—29	104.2	..	..	..	..	..	..
—30	99.0	..	..	..	..	..	..
—31	..	..	..	..	..	..	..
—32	..	..	..	..	..	..	..

\* Figures below this mark column correspond to ages at the beginning of the appropriate class interval indicated in column 1, for instance, 36.0 lbs. is the average weight of boys of 4 years of age.

TABLE LIV—*contd.**Average Weight According to Age and Sex for Various Populations—contd.*

Age.	FEMALE.				
	Singur.	Residential institutions in South India.	Families of industrial cooly workers in Assam.	Well to do families from Calcutta.	Normal children of America.
—1	18.8	..	..	..	16.0
—2	16.5	..	..	..	23.0
—3	10.4	..	..	..	28.5
—4	35.1	..	..	..	33.5
—5	25.5	..	..	..	35.0*
—6	29.2	..	..	..	39.8
—7	31.5	..	33.4	43.2	43.8
—8	35.2	..	30.0	50.0	48.0
—9	39.6	..	44.3	54.0	62.0
—10	45.3	..	45.7	68.9	57.5
—11	49.4	53.68	51.5	74.3	61.1
—12	51.2	57.85	56.0	79.0	70.4
—13	55.6	64.88	60.2	91.0	81.8
—14	67.6	73.07	..	95.2	82.5
—15	71.8	80.49	..	99.7	94.5
—16	81.2	87.95	..	94.8	..
—17	83.7	88.11	..	110.7 <sup>1</sup>	..
—18	85.1	89.50	..	..	..
—19	84.0	..	..	..	..
—20	86.8	..	..	..	..
—21	84.8	..	..	..	..
—22	84.6	..	..	..	..
—23	80.7	..	..	..	..
—24	85.0	..	..	..	..
—25	84.3	..	..	..	..
—26	84.8	..	..	..	..
—27	83.5	..	..	..	..
—28	84.0	..	..	..	..
—29	84.1	..	..	..	..
—30	85.3	..	..	..	..
—31	85.1	..	..	..	..
—32	84.4	..	..	..	..

\* Figures below this mark column correspond to ages at the beginning of the appropriate class interval indicated in column 1, for instance, 35.0 lbs. is the average weight of girls of 4-years of age.



## Height.

In Singur experience the main age-height curves for males and females show lesser differences and fluctuations than the average age-weight curves. (See Chart 5). The age height curves for both sexes start from about the same figure viz. 23.8 inches for children under 1 year of age. The male child has a higher initial rate of increase but at the fourth year the two curves coincide. For the next two years he is again taller than the female child but at the sixth year she comes abreast. Afterwards boys maintain their superiority throughout except at the 11th year when the girls are slightly taller.

The American infant starts with an advantage of nearly two and a half inches over the Singur infant. By the time he reaches his 4th year he is taller than the Singur child of the same age by about 5 inches. It is noteworthy that at the age period 12 to 14 years the American girl is taller than the boys, whereas in the present data, opposite is the case. Comparing the ages of children having same height from the American and Singur data, it is found that at the start the Singur child suffers a lag of half a year, the difference increases to about two and a half years by the time they reach their 12th year.

## Rate of increase of height.

From Singur data it would appear that the maximum increase in height both for the male and the female child is in the second year. Thereafter, the male increases steadily till the 15th year. At the fifteenth year his growth is arrested for one year but from the 16th year it again continues till the age of 20. The rate of increase in stature of the female shows considerable fluctuations. During the fourth year, sixth year and the 14th year the increase in height is very slow. Taking 18 inches as the initial value the body length in both sexes nearly doubles by the fifth year and trebles by the 14th year.

However, as may be seen from Table LV. The point which needs special mention is that both as regards height and weight the Singur children are inferior to not only the American children but also to Indian children (Chatterji, 1933) on whom studies have been made. This is true even when comparison is made with children selected from poor families in Bengal (Wilson, Ahmad and Mitra, 1937) and Assam (Wilson and Mitra, 1938). One wonders whether the inferiority of the Singur people in respect of height and weight is a normal feature or it is a temporary phase due to the food crisis during which the observations were made. In the former case, the racial and environmental factors require deeper studies. In the latter case one should be careful in interpreting results of later surveys.

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*N.B.*—The accuracy of statement regarding age may be open to some doubt in the case of Singur data. The classification given in the schedules is clear and unequivocal. The investigator may be misled from the information given by the person or guardian. The interest in this connection to mention that according to the Indian custom a child who has completed 3 years is described as 4 years of age; but his age according to the English custom would be 3 years. Thus in India the age is reckoned according to the next birthday when the west it is counted according to the last birthday.

TABLE LV.

Average Height (in inches) According to Age and Sex for Various Populations.

Age.	MALE.							FEMALE.		
	Singur.	Residen- tial Insti- tutions in South India.	Families of Indus- trial cool workers in Assam.	Well to do families from Calcutta.	Benga- lee stu- dents.	Poor class Benga- lee Hindus.	Normal Ameri- can.	Singur.	Residen- tial Insti- tutions in South India.	Normal Child- ren of Ameri- ca.
—1	28.4	..	..	..	..	..	26.5	23.8	..	25.9
—2	28.3	..	..	..	..	..	31.6	27.5	..	31.0
—3	30.7	..	..	..	..	..	35.2	29.5	..	34.9
—4	32.8	..	..	..	..	..	38.5	32.9	..	38.5
—5	35.2	..	..	..	..	..	39.0*	34.4	..	39.0*
—6	37.7	..	..	..	..	..	41.7	37.9	..	41.4
—7	40.0	..	..	..	..	..	44.1	39.7	..	43.6
—8	42.0	..	42.8	48.1	47.6	45.48	46.2	42.2	..	45.9
—9	47.9	..	46.7	48.5	48.5	47.55	48.2	44.5	..	48.0
—10	42.8	..	48.5	51.3	50.3	48.85	50.1	46.8	..	49.6
—11	48.0	51.17	49.4	52.4	52.5	50.63	52.2	48.4	50.2	51.7
—12	50.5	52.5	50.5	53.8	54.8	53.15	54.0	49.9	52.09	53.7
—13	52.1	53.45	53.4	56.5	56.6	55.75	55.7	51.2	53.41	56.9
—14	55.0	56.43	..	..	58.9	..	57.0	54.0	55.82	57.5
—15	55.8	58.43	..	..	61.3	..	59.5	55.0	57.28	60.2
—16	57.6	59.46	..	..	64.6	..	..	56.4	58.16	..
—17	60.2	61.82	..	..	65.6	..	..	56.2	58.40	..
—18	60.6	63.35	..	..	66.1	..	..	56.5	58.57	..
—19	62.2	..	..	..	66.4	..	..	57.0	..	..
—20	61.8	..	..	..	66.4	..	..	58.0	..	..
—21	62.4	..	..	..	66.3	..	..	58.4	..	..
—22	62.0	..	..	..	66.7	..	..	56.8	..	..
—23	62.6	..	..	..	66.2	..	..	57.2	..	..
—24	63.0	..	..	..	66.1	..	..	55.1	..	..
—25	62.3	..	..	..	66.4	..	..	56.9	..	..
—26	61.6	..	..	..	..	..	..	56.6	..	..
—27	62.9	..	..	..	..	..	..	56.8	..	..
—28	63.2	..	..	..	..	..	..	57.1	..	..
—29	62.8	..	..	..	..	..	..	57.1	..	..
—30	63.5	..	..	..	..	..	..	57.1	..	..
—31	63.0	..	..	..	..	..	..	57.6	..	..

\* Figures below the mark in this column correspond to ages at the beginning of the appropriate class interval indicated in column 1. For instance, 39.0 inches is the average height of boys or girls, 4 years old in the class interval of 4 to 5 years of column 1.

## CHAPTER V.

## SOCIO-ECONOMIC CONDITIONS.

The smallest political unit in Bengal is the Union Board which was created in 1919 and reorganised in 1938 under the Village Self-Government Act. The Union Board is a local body consisting of 6 to 9 members of which two thirds are elected and one third are nominated. The President is elected by the members. Among others it discharges the following functions :

Control of sanitation and conservancy, prevention of public health nuisance, sanitary arrangements of melas, birth and death registration, execution of all works necessary for the preservation of the conservancy or drainage of the Union, reporting of epidemics amongst men and cattle, control of erection of buildings, provision and maintenance of public water supply, establishment of dispensaries and prohibition of dangerous trades. The President of the Union has been given special responsibility in the matter of control and distribution of food and certain consumers goods during the period of emergency.

It raises funds by direct taxation on households and is also provided by certain funds by the District Board for specific purposes. In Table V are set out the details regarding area, population and public funds at the disposal of each of the 4 Unions constituting the Singur Health Centre.

The proceedings, records and properties of the Union Board are under the supervision of the Divisional Commissioner and may be inspected and supervised by District Magistrate, Sub-divisional Magistrate, Circle Officer, Chairman of District Board and Local Board or any other person authorised by them or by the Provincial Government.

The organisation set up by the Singur Health Centre seeks to utilise the voluntary services of the permanent residents at different stages of administration. Thus there is a Unit Public Health Advisory Committee for two Union Boards, a Union Board Public Health Advisory Committee for each Union Board and a Village Sanitation and Welfare Committee for each village or part of a village. It is intended to allocate certain specific technical duties to each member of the village Sanitation and Welfare Committee for which he has received a special training. The five main functions of this Committee are : (i) sanitation, (ii) vital statistics, (iii) maternity and child welfare, (iv) epidemic intelligence, and (v) organisation and control of epidemics and anti-malaria work. These committees are in the course of organisation. It is intended that the functions of the co-technical members will be mainly supervisory and provide technical guidance for the work carried out by the volunteers who have also been trained for the purpose. Running comments on some of the public health activities according to the present organisation are given below :

According to the previous practice it was the duty of the Chowkidars to report births and deaths in their respective villages to the President of the Union Board every fortnight, recorded the events in the prescribed form (Appendix IVa & b). For assessment of the value of the routine statistics see page 177. The scheme for improvement provides a check over these records by making one of the members of the Village Sanitation and Welfare

Committee responsible for reporting the events in the same forms, with certain additional columns to the Sanitary Inspector. A copy is kept with him which may be inspected by the R.M.O.H. during his visit to the village. The member-in-charge of sanitation looks after the water supply and the scheme for the disposal of faecal matter. For the latter purpose bored-hole latrines are to be provided. It is the duty of the co-technical members to push the installation of the latrines in their respective villages and to report to R.M.O.H. when a tube well goes out of order. Later, it is contemplated to train local volunteers to carry out minor repairs to the wells. Similarly, other co-technical members are charged with special responsibilities regarding the execution of the scheme in their respective spheres. In certain villages the members for epidemic control have organised voluntary anti-malaria campaign. The Rural Medical Officers organise and supervise the work of these Committees. Other personnel and their functions in the Reorganisation Scheme are diagrammatically represented in Appendix I to which reference may be made.

In addition to the medical and sanitary provisions contained in the above scheme the official and non-official institutions and practitioners concerned with medical relief are set out in Table LVI.

TABLE LVI.

*The Existing Institutions and Practitioners (1944) Concerned in Medical Relief.*

Union Board.	Hospital		Public dispensary.	Hospital & dispensary doctors.	Private medical practitioners				Dais	
	Permanent.	Emergency.*			Registered.	Ayurvedic.	Quack.	Homeopath.	Trained.	Untrained.
Singur .	1	0	0	1	4	1	4	6	6	4
Balarambati	0	0	1	1	1	0	4	2	10	3
Bora .	0	1	1	1	2	0	11	2	2	3
Begumpur .	0	0	1	1	2	0	12	6	0	7
TOTAL .	1	1	3	4	9	1	31	16	18	17

\* NOTE.—The emergency hospital put up in 1944 provides indoor accommodation for 20 patients.

There is only one permanent hospital at Singur under the management of the District Board of Hooghly built through the munificent donation of late Mr. Surendra Nath Mallik, C.I.E. of Singur. This hospital provides accommodation for fourteen indoor patients—ten for men and four for women and 2 beds for infectious diseases in a small detached building. It has also an outdoor section for receiving patients every morning. There are three outdoor dispensaries maintained by Local Bodies, one each at Bora, Begumpur and Jagatnagar (Balarambati Union) in charge of a registered doctor. They are all charitable Institutions. There are only 18 trained Dais (mostly recently trained) as against an estimated requirement of 70 trained Dais.

Table LVI shows that the proportion of practitioners of scientific medicine is one per five thousand population and that for every such practitioner there are more than four quacks, from which it would appear that there is considerable public demand for medical relief which remains unsatisfied at present. In 1943, against a total budget of Rs. 8,882 for the public hospitals and dispensaries

the amount spent on private medical advice and treatment is estimated at Rs. 1,57,500 per annum. This is not surprising when one considers the high rate of morbidity prevailing in this area which amounts to 12 per cent of the population at any time. During that period the hospitals and dispensaries on an average took care daily of only 0.012 per cent and 0.32 per cent of the population in indoor and outdoor sections respectively. Thus, in order to provide the most rudimentary state medical assistance it is necessary that the present outdoor dispensary facilities should be multiplied 36 folds. At present there are 4 dispensaries and according to the above suggestion 144 dispensaries would be required. However, it may be argued that the present centres of medical relief are not working to their full capacity because only 200 outdoor patients are attending and the average daily attendance per dispensary works out to 50. This does not take into consideration the regular seasonal concentration of cases nor the periods of epidemic prevalence. However, this poor attendance raises the question why the dispensaries are not popular and why they should not each attract say 100 persons every day. Even if they did so an area of 32 square miles will require 72 dispensaries of the type now provided there. This is hardly practicable.

TABLE LVII.

*Average Daily Attendance of Patients in the Public Charitable Hospitals and Dispensaries in the Four Union Boards.*

Hospitals or dispensaries.	Indoor.	Out-door.
Singur R. M. Charitable Hospital . . . . .	7.5	60.1
Bora Prasannamayee Charitable Dispensary . . . . .	..	50.5
Balarambati U. B. Dispensary at Jagatnagar . . . . .	..	33.4
Begumpur U. B. Charitable Dispensary . . . . .	..	40.0
TOTAL . . . . .	7.5	204.0

Most of the sick people therefore seek private advice if they can afford or choose to do so, and since more than 78 per cent of the private practitioners are unqualified men, greater part of the money spent on private medical relief must necessarily be wasted. This money could be utilised to the best advantage only if sufficient number of practitioners of scientific medicine could be attracted to the rural areas and the public could be educated to appreciate this system of treatment or in the alternative the public funds could organise and make easily available to everyone who needs, the services of trained medical men and women as well as the medicines. It is a question whether a progressive health policy must accept the present position of sickness and meet it or some alternative scheme of welfare work and preventive medicine should be emphasised to reduce morbidity to manageable proportion.

#### Cultural and educational facilities.

There are 49 schools, two High English, four Middle English, 26 Upper Primary and 16 Lower Primary. Besides, there is a Night school for adults near Singur. According to the information available Primary sections of 41 schools are recognised by the Education Department.

TABLE LVIII.

*Distribution of Various Types of Schools in the Four Unions.*

Union Board.	H. E. SCHOOL.			M. E. SCHOOL.			UPPER PRIMARY.				LOWER PRIMARY.					Total.
	Boys.	Girls.	Mixed.	Boys.	Girls.	Mixed.	Boys.	Girls.	Mixed.	J. Mad. instn.	Boys.	Girls.	Mixed.	Muktab.	Night school.	
Singur . . .	1	..	..	..	1	..	..	..	8	..	..	..	2	..	1	13
Balarambati . . .	..	..	..	..	..	..	..	..	6	1	..	..	2	2	..	11
Bora . . .	1	..	..	..	..	..	..	..	4	..	..	..	7	..	..	12
Begumpur . . .	..	..	..	..	1	1	1	2	4	1	..	..	3	..	..	13
<b>TOTAL .</b>	<b>2</b>	<b>..</b>	<b>..</b>	<b>..</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>22</b>	<b>2</b>	<b>..</b>	<b>..</b>	<b>14</b>	<b>2</b>	<b>1</b>	<b>40</b>

It would appear from Table LVIII that the schools are more or less distributed over the four Unions. Of the high schools one is at Singur and the other at Bora. There are 4 schools exclusively for girls, of which 2 are M. E. Schools, one at Singur and the other at Begumpur. The remaining two are primary—both in Begumpur Union. To balance this, there are 5 schools—two High schools, 2 *Madrasas* and one Upper Primary that exclude girls. Three of the 4 girl schools are in the Begumpur Union. There are two Junior *Madrasas* and 2 *Muktab*s meant solely for Muslims in the Balarambati Union.

Teachers in the primary schools number 83, of which two are trained matriculates and 23 trained non-matriculates. The rest are untrained. The average monthly salary of a primary school teacher is Rs. 8. The total number of pupils in primary classes is 2,688, the average enrolment per school being 65. This represents 4.3 per cent of the total population or only 28 per cent children population between the ages 5 and 10 years. Only 20 per cent of the children of Class I reach upto Class IV. The ill-paid teachers are much discontented, the teaching is unsatisfactory and there is a great deal of wastage. The schools are housed under insanitary conditions and are mostly in bad state of repairs. They are not provided with latrines, and in most cases even with clean water. The sites have not been properly selected and the surroundings are often filthy. Thus much remains to be done in the way of improvement of primary education in this area. (See photo 28.)

The newly organised Singur Health Centre has trained about 50 teachers in three batches to introduce school health programme in the primary schools. These teachers belong to 32 primary schools which are distributed in the four Unions as follows—Singur 12, Balarambati 6, Bora 4 and Begumpur 10.

There are few facilities for improving the society's cultural relations. Small public reading libraries are maintained at Bora and Begumpur. There are three local clubs one each at Singur, Bora and Baratajpur, whose main function is to encourage games, sports and physical culture.

#### Literacy.

Of the 6,388 individuals in Group I the number of literates is 1,236 or 20 per cent. The literacy amongst males amounts to 34 per cent and amongst

females to only 3.5 per cent. The percentage of literacy amongst males above 10 years is 42.5 as against 4.5 amongst females. In other words, there is only one literate female for nine literate males. Of the 1,720 children of school-going age between 5 and 15 years only 363 or 21.1 per cent are literate, the rates for the boys and the girls being 33.3 and 6.1 per cent respectively. Female education has lagged behind and since 32.3 per cent of boys in this age group are at present going to school as against only 4.8 per cent of girls the disparity between the education of the two sexes will be maintained. No serious efforts for adult education are being made, and therefore, illiteracy specially amongst the females will not be abolished for a long time. Further details of educational status of the community is shown in Table LIX.

TABLE LIX.

*State of Education in the Sample Population.*

Literacy.	MALES.								FEMALES.							
	—5	—10	—15	—20	—25	—30	30 +	Total.	—5	—10	—15	—20	—25	—30	30 +	Total.
Illiterate . . .	471	371	261	102	143	120	666	2,194	488	464	261	217	294	247	987	2,958
Literate . . .	..	92	80	65	71	72	305	685	..	12	17	13	11	12	16	81
Secondary . . .	..	34	81	28	19	8	61	230	..	4	14	3	3	1	1	26
High School . . .	..	2*	27	43	25	27	70	194	..	..	..	..	1	..	..	1
University . . .	..	..	..	1	2	2	14	19	..	..	..	..	..	..	..	..
TOTAL . . .	471	499	449	299	259	229	1,116	3,322	488	480	292	233	309	260	1,004	3,066

\* Evidently this is a mistake, probably the children attend primary section of a high school.

It may be interesting to see how the boys and girls of school-going age who are not going to school are employed. The relevant information is set out in table LX.

TABLE LX.

*The Mode of Employment of Boys and Girls of School-going Age.*

Mode of employment.	MALES.			Total.	FEMALES.			Total.
	—10	—15	—20		—10	—15	—20	
Going to school . . .	146	161	48	355	19	18	0	37
At home . . . . .	350	184	13	547	461	272	220	952
Working for a living . . .	3	104	233	340	0	2	4	6
TOTAL . . . . .	499	449	299	1,247	480	292	233	1,005

From Table LX—It may be seen that all girls and almost all boys between 5 and 10 years of age who do not go to school stay at home. Between 10 and

15 years 23 per cent of the boys have gone to work and 22 per cent of the girls have married. In the next quinquennial age group the girls have assumed the responsibilities of housewife as all but fourteen girls have married. The boys, on the other hand, have been absorbed in work leaving 13 at home. Thus early marriage of the girls on the one hand and need for earning livelihood by the boys on the other hand largely explain why older children do not go to school in large numbers. What could be the reason for younger children staying at home? This point needs investigation but tables LXI and LXII suggest that it is not so much the ill-health which prevents school attendance but the economic circumstances or factors associated with them have something to do with it. The reason why children not going to school exhibit less sickness than those attending may be the differences in age constitution of the two groups. Under the existing socio-economic conditions, therefore, progress in education cannot but be slow.

TABLE LXI.

*Economic Status of Boys of School-going Age According to School Attendance.*

Boys.	ECONOMIC STATUS.						Total.	
	Group I.		Group II.		Group III.			
	No.	P. C.	No.	P. C.	No.	P. C.	No.	P. C.
Attending School .	08	44.7	48	26.5	33	20.6	149	30.2
Not attending School .	84	55.3	133	73.5	127	79.4	344	69.8
TOTAL .	152	..	181	..	160	..	493	..

TABLE LXII.

*Health Status of Boys of School-going Age According to Attendance at School.*

Boys.		HEALTH STATUS.				Total.
		Well.	Acutely ill.	Chronically ill.	Indifferent health.	
Attending School	{ No. . .	312	7	10	30	359
	{ P. C. . .	86.0	1.0	2.8	8.4	28.7
Not attending School	{ No. . .	703	13	21	61	801
	{ P. C. . .	89.0	1.6	2.4	7.2	71.3
TOTAL . . .	{ No. . .	1,105	20	31	94	1,250
	{ P. C. . .	88.4	1.6	2.5	7.5	..

We have so far dealt with the numbers but a reference to LIX will show that the grade of education is also poor. Thus only 4 per cent of the population (7 per cent of males and 0.8 per cent of females) have had secondary education and 3 per cent of the population (6 per cent of males and 0.3 per cent



of females) have had high school education and only 0.3 per cent have been to the University. They are all men.

### Addiction.

Amongst the addicts are included only those persons who when denied the particular intoxicant experience mental or physical inconvenience or injury. Tobacco smoking, alcohol, opium and 'bhang' (*Canabis-indica*) are the principal intoxicants used (*vide* Table LXIII). Among others the most popular intoxication is tobacco chewing or snuffing. While over 93 per cent of the females above 10 have no such vice, only 35.7 per cent males of corresponding age groups totally abstain from intoxication. However, they mainly resort to the comparatively innocent habit of smoking which is practised by 63.6 per cent, mainly above 20 years. Only 3.3 per cent amongst males, chiefly young adults take alcohol. Opium is taken by 1.7 per cent of males, mainly by old people. 'Bhang' is not particularly popular. Amongst the females, tobacco chewing is the principal addiction, but a number of old women take opium. There was one extraordinary case of a male child under 10 who both smoked and drank.

TABLE LXIII.

### *Distribution of Addicts According to Age and Sex.*

Nature of addiction.	MALES.					FEMALES.						
	—15	—20	—50	50+	Total.	Percent- age	—15	—20	—50	50+	Total	Percent- age.
Smoking . . .	14	107	1,052	323	1,496	63.6	0	1	7	2	10	0.5
Alcohol . . .	0	4	62	12	78	3.3	0	0	0	0	0	0.0
Opium . . .	0	0	5	34	39	1.7	0	0	6	11	17	0.8
Charas . . .	0	0	1	0	1	0.04	0	0	0	0	0	0.0
Bhang . . .	0	1	4	1	6	0.26	0	0	0	0	0	0.0
Others . . .	0	2	50	23	84	3.0	7	3	84	20	123	5.0
Nil . . .	435	192	180	33	840	35.7	285	229	1,112	329	1,955	93.2
Population . .	440	290	1,240	364	2,352	..	202	233	1,207	366	2,098	..

### Occupation.

It is essentially an agricultural population in which 58.5 per cent of males above 15 years till their own lands. In addition (*vide* Table LXIV) 59 children help in cultivation. On the other hand, women remain at home, the percentage of females above 15 employed in domestic work being 95.8. Nearly one-fourth (24.3 per cent) of the males above 15 years are labourers, mostly helping on the land, but 5.3 per cent are industrial workers. Besides, 33 male children also work as labourers. Transport engaged only 7 per cent. Shop-keeper and artisan constitutes 6.4 and 1.6 per cent of the male population over 15 respectively. Twelve children also work in the shops. Only 2.3 per cent adult males are pursuing liberal professions; 4 per cent of them stay at home, 2.5 per cent however, have passed the age of 55. Only 307 or 32.4



The rest of the land is mostly occupied by homesteads, bamboo groves, tanks and *dobas* and waste lands. Rice is the principal crop, of which the 'Aman' paddy which is harvested in autumn take up 8,600 acres and the inferior and less popular, 'Aush' paddy which is harvested just before the monsoon is cultivated in less than 3,000 acres. More valuable crops like fruits, vegetables and betel leaves occupy 1,550 acres. Jute, the cultivation of which is being reduced is grown in 2,500 acres. The paddy produced in this area suffices for 6 to 9 months only, and rice has, therefore, to be imported from outside in normal times. This is particularly so in Bonga Union. The economic crops are banana plantation, betel plantation and vegetables which include potato, gourd, pumpkin, brinjal, cabbage, cauliflower, beans, leafy vegetables, yam, okra, green chilies, cucumber, tomato, sweet potato and marrow. Green coconut, pine-apple, papaya and lime are cultivated on a limited scale. These products find a good market in Calcutta, and other wholesale markets such as Sheoraphuli and Belur. Special railway facilities are provided for the transport of fruits and vegetables to Calcutta. (See photo 26.) The 'rabi' crops consist mainly of pulses and mustard which are grown after 'Aman' paddy has been harvested.

### Animals and live-stocks.\*

The principal agricultural animals are bulls and cows of which there are 10,600 and 9,200 respectively. There is an additional young stock of 5,700. These animals are poor in quality. The milching cows are not many and yield little milk. Most of the milk produced is either converted into *channa* or milk casein (see photo 25) for consumption in the neighbouring cities or is transported as fluid milk to Calcutta. It is estimated that 80 to 100 mls. of *channa* leave Singur station for Calcutta every day. (See photo 27.) Little milk is left for local consumption. Similarly, goats too are kept not so much for local consumption as for trading in the towns. Poultry birds are estimated at 400, and the great demand for eggs in the town leaves but few for local consumption.

\* Some of the figures quoted here have been obtained from a report by the Additional Director of Agriculture, Bengal on a short term agricultural programme at Singur, 1945.

### Pisci-culture.

Such fish as is available is raised in a primitive way by the people in *dobas* and tanks. The rivers being dead the principal source of fish has been dried up. Some fish is imported from the great rivers into Singur market, but on an average, fish is available to an ordinary man only once in a week. Considerable improvement in pisci-culture is possible if the tanks and *dobas* are more scientifically employed for this purpose.



TABLE LXVI.  
Main Features Regarding the Local Markets.

Union Board.	Location.	Nature.	Frequency of Occurrence.	Day or days of the week.	Average attendance	Special commodities if any.
Singur . . .	Singur . . .	Bazar . . .	Daily . . .	All days . . .	200	....
Singur . . .	Singur . . .	Haat . . .	Bi-weekly . . .	Thursday & Sunday . . .	2,000	Banana, vegetable produce.
Singur . . .	Atalla . . .	Haat . . .	Bi-weekly . . .	Tuesday & Saturday . . .	1500	Banana, vegetable produce.
Balarambati . . .	Kamarkundu . . .	Haat . . .	Bi-weekly . . .	Friday & Monday . . .	1000	Vegetable and poultry produce.
Balarambati . . .	Jagatnagar . . .	Haat . . .	Bi-weekly . . .	Tuesday & Saturday . . .	500—800	....
Balarambati . . .	Basubatti . . .	Haat . . .	Bi-weekly . . .	Wednesday & Saturday . . .	500—600	....
Dora . . .	Dora . . .	Bazar . . .	Daily . . .	All days . . .	100—125	Banana.
Dora . . .	Doral . . .	Haat . . .	Weekly . . .	Wednesday . . .	1200	Vegetable produce mainly.
Dora . . .	Haripur . . .	Bazar . . .	Daily . . .	All days . . .	50—100	....
Dora . . .	Manirampur (Barulpara) . . .	Bazar . . .	Daily . . .	All days . . .	200	Vegetable produce mainly.
Begumpur . . .	Begumpur . . .	Bazar . . .	Daily . . .	All days . . .	200	....
Begumpur . . .	Begumpur . . .	Haat . . .	Bi-weekly . . .	Thursday & Sunday . . .	1200	Vegetable produce mainly.
Begumpur . . .	Chhotatalpur . . .	Bazar . . .	Daily . . .	All days . . .	300—100	Betel, banana and vegetable.
Begumpur . . .	Jalkristapur . . .	Bazar . . .	Daily . . .	All days . . .	300	....
Begumpur . . .	Adan . . .	Bazar . . .	Daily . . .	All days . . .	50	Betel.
Begumpur . . .	Panchghara . . .	Bazar . . .	Daily . . .	All days . . .	50	Betel.
Begumpur . . .	Nalty . . .	Bazar . . .	Daily . . .	All days . . .	100	....



TABLE LXVII.  
Statement of Local Melas held Annually in Singur Health Centre Area.

Union Board.	Place.	Name of the mela.	When held.	Duration.	Average daily attendance.	Licensed or not.	Sanitary arrangements.
Singur	North Mamudpur	Rash mela	October or November	10 to 12 days	300—400	Yes	Only water supply.
Singur	Singer Bazar	Car festival	July	2 days	500—600	No	Nil.
Singur	Ratanpur	Charakmela	April	1 day	300—400	No	Nil.
Singur	Hiranagar	Charakmela	April	1 day	300—400	No	Nil.
Singur	Ranagar	Charakmela	April	1 day	300—400	No	Nil.
Balamambati	Kamarkunda	Rashmela	October or November	10 days	500—600	Yes	Only water supply.
Balamambati	Balamambati	Car festival	July	1 day	300	No	Nil.
Balamambati	Besubati	Jath mela (Kusilim)	January	8 days	200	Yes	Only water supply.
Bora	Bora	1. Rash mela	November	1 day	300	No	Nil.
		2. Dol mela	February	1 day	300	No	Nil.
		3. Durga puja	September or October	1 day	500	No	Nil.
Bora	Boral	Charakmela	April	1 day	300	No	Nil.
Bora	Bardipara	Charakmela	April	1 day	400	No	Nil.
Bora	Hariapur	Charakmela	April	1 day	200	No	Nil.
Begumpur	Adan	Charakmela	April	1 day	300	No	Nil.
Begumpur	Nally	Charakmela	April	1 day	100	No	Nil.
Begumpur	Chototajpur	Car festival	July	1 day	400	No	Nil.
Begumpur	Thia	Charakmela	April	1 day	200	No	Nil.
Begumpur	Sabana	Charakmela	April	1 day	200	No	Nil.
Begumpur	Jalkristapur	Charakmela	April	1 day	300	No	Nil.

## Movements.

Mention has already been made of the chief means of communication. In this small area there are 7 railway stations. Each of them is a busy place where large number of passengers may be seen waiting for the trains. They consist mainly of daily passengers to Calcutta and suburban areas—some going there to work, others carrying local products and still others going and coming for social visits to relations and friends. The train service is estimated to carry 1,000 daily passengers to and from Calcutta who live in the villages but work in the town. About 1,200 vendors also travel daily to the towns to sell their goods. Industrial workers who go daily to factories and railway workshops number about 500. A number of people come from the towns on week-ends to stay with their families for a couple of days. In normal times the metalled roads from Sheoraphuli to Singur and Kamarkundu and from Uttarpara to Begumpore and Bora *viâ* Janai have a considerable motor traffic but this has recently suffered from lack of petrol. Apart from these modern facilities the intervillage traffic is mainly by bullock carts and by push bicycles. Palanquins may be occasionally seen carrying women, old people and invalids. Cycle rickshaws are becoming popular at Begumpur. Occasionally the hackney carriages may be seen, but they come temporarily from Serampore. Considerable movement of population takes place on account of *melas* and parties of pilgrims passing through Singur on their way to Tarakeswar. Since official activities have recently grown in Singur, official visitors frequently tour in the area. During the rains movements become greatly restricted as the *katcha* roads and meadow paths become impassable.

## Food supply and distribution.

Bengal has recently passed through severe food crisis. However, the Health Centre Area did not suffer as severely as other parts of the province probably for the following reasons :—

(1) Certain families received rations through the members employed at Calcutta or Serampore as clerks or at Industrial establishments as workers.

(2) Many agriculturist families were able to get over the crisis because they normally keep rice for their own use and depend upon money crops for trade.

The suffering was manifest chiefly amongst landless labourers and amongst families producing insufficient rice for personal use and depending mainly on business in potatoes and vegetables.

(3) The local people themselves promptly organised and started centres for destitutés.

During the period of survey several voluntary and official destitute camps were established. The effects of this stress have, however, been felt late, for in 1944 there were 10 per cent deaths in excess of 1943. It may thus be generally stated that the famine conditions had a cumulative effect on the population of this locality rather than an immediate effect. At certain times there was an acute shortage of rice, *atta*, salt, sugar and kerosene. For the last few months rationing has been introduced in several places including Singur, Balarambati, Bora and Begumpur. The authorities have issued



many grades of ration cards for people of varying economic status and requirements. At present rice, *atta*, salt, sugar and kerosene are being supplied through the controlled and approved ration shops set up in each locality. Black market flourished well here as elsewhere.

## CHAPTER VI. Family Organisation.

Family as a unit has been given a biological significance by the Peekham experimentors and as such it has been endowed with the properties of an organism. There is much in their arguments with which we are in agreement. Old Indian tradition made a great deal of family culture as a presumptive evidence of the future behaviour of young men and young women. "Chip of the old block" is an old English saying what tersely expresses the same truism. There may or may not be a romantic revolt against the family tradition on the part of the young person as he or she emerges into fullness of manhood or womanhood depending upon his native vigour, richness of early life in the family and the force of extra-familial environment but there can be little doubt that apart from the inherited capabilities the environmental influences impinging upon him or her in the most appetitive phase of life must necessarily determine, to a large extent, the course of future activities and put limitations on actual accomplishments.

The present survey being a point study, does not provide material for a discussion of the family environment and its reactions on parents and children and to that extent the title of this chapter may be considered too ambitious. However, we hope to present a rough structural basis of the family organisation which may provide material foundation for the study of function. Our excuse for the furtive excursion into the study of function based as they are on impressions gathered in the course of conversation with family members may have little scientific value, is mainly to draw the attention of public health investigator to a rich field of work which he has so far generally neglected but which he cannot afford to ignore if he desires to raise public health administration from the rule of thumb to full scientific stature.

Of the one thousand one hundred and ninety-seven families which have been included in the survey the family schedules are available for 176 only. The number of individuals in 1,197 families is 7,058. The average size of the family works out to be 5.9 S.D.  $\pm 3.4$ .

From the statement given under health indices it will appear that only 30 males and 44 females belonging to the area temporarily resided outside. This is a relatively small number. However, that is not the whole story for a considerable number, roughly estimated at 5 per cent of the population, are daily passengers to and from Calcutta and Suburban Industrial Areas. This problem is more fully dealt with earlier under 'movements' and it is evident that the community is by no means a closed one. This fact has considerable influence on the social, economic and epidemiological circumstances of the community.

TABLE LXVIII.  
*Length of Stay in the Health Centre Area During the Year 1943.*

Residential Status.	LENGTH OF STAY.													Total
	1m	2m	3m	4m	5m	6m	7m	8m	9m	10m	11m	12m	12+	
Group I . . .	13	22	25	35	24	21	33	22	24	19	28	0	6,122	6,388
Group III . . .	1	1	0	0	2	1	0	3	0	1	0	15	0	24
Group V . . .	40	24	15	1	17	4	1	3	1	2	7	24	0	139

From Table LXVIII it will be seen that in Group I only 266 individuals have stayed in the area for less than 12 months. Of these 247 are infants whose length of stay is determined by the age. On the other hand, in Groups III and V the number of infants is small, being 1 and 15 respectively. It would thus appear that the people of this area do not stay out for any length of time.

Of the families for which the schedules have been filled 67 per cent are single, 27 per cent are joint and 5.9 per cent are multiple establishments. Thus about one-third of the families are joint or multiple units. There is a general tendency towards single families; this is because of the increasing contact with the outside world which has created both the opportunities for independent employment and a greater desire to live an independent life.

An attempt has been made (*vide* key to the family schedule) to roughly estimate the general outlook of the families in respect of health matters. The relevant information is contained in Table LXIX.

TABLE LXIX.

*Family Outlook in Matters of Food.*

Families.	FAMILY OUTLOOK.			Total.
	Rational.	Traditional.	Prejudiced.	
Number . . . . .	169	917	57	1,173*
Percentage . . . . .	14.4	80.7	4.9	..

\* Information is not available for 3 families.

TABLE LXX.

*General Family Outlook on Cause of Diseases.*

Families.	FAMILY OUTLOOK.				Total.
	Rational.	Deistic.	Demonistic.	Other supernatural.	
Number . . . . .	453	404	271	45	1,173*
Percentage . . . . .	38.6	34.4	23.1	3.8	..

\* Information is not available for 3 families.

TABLE LXXI.

*General Family Outlook on Prevention and Cure of Diseases.*

Families.	FAMILY OUTLOOK.				Total.
	Rational.	Religious.	Fatalistic.	Stoic.	
Number . . . . .	448	441	283	0.	1,172*
Percentage . . . . .	38.2	37.6	24.1	0.	..

\* Information is not available for 4 families.

TABLE LXXII.

*General Family Outlook Regarding Organised Community Effort.*

Families.	FAMILY OUTLOOK.			Total.
	Individualistic.	Balanced.	Highly Socialistic.	
Number . . . . .	828	339	6	1,173*
Percentage . . . . .	70.6	28.9	0.5	..

\* Information is not available for 3 families.

While it is admitted that a considerable amount of personal judgment is involved in arriving at an estimate of family outlook in various matters, the data presented in Tables LXIX to LXXII are of considerable interest, because, for the time being, they provide the bases for designing the best method of approach by the public health administrator and in later surveys they would indicate the extent to which health education has been successful. There can be little doubt that *the achievements in the domain of public health, in a democratic country, must largely depend upon what people think and what they are prepared to do themselves.* In the present case a deeper study of the traditional ideas regarding food is indicated and a carefully organised health education is required to disseminate basic scientific knowledge of dietetics so as to rationalise their outlook on food. This will tend to effect improvement in their diet, if it is economically feasible. In regard to the causation of diseases something must be done to wean the people from supernatural theories in favour of more rational views, and if this is accompanied by the provision of means to fight the diseases in a scientific manner, there is every likelihood that the fatalistic and religious attitude towards the prevention and cure of disease will disappear giving place to a greater desire for co-operation with organised scientific campaigns.

It is well known that at present the community sense is poorly manifested in this country, however high the individual attainments may be. While personal health practices may go a long way towards creating a healthy community there are few activities in which organised community effort is better rewarded than in matters of health. However, it is a question whether as a matter of policy, under the existing conditions, greater emphasis on personal health practices may not elicit better response than insistence on organised community effort. The latter may more suitably follow after some progress has been made as regards personal health and health consciousness has materially developed. Thus at an early stage of health campaigns personal services like maternity and child welfare, school health, particularly correction of defects, medical relief and organised physical culture may have better appeal than certain environmental improvements in which the individual effort is not directly rewarded. Care, however, has to be taken to gradually shift the burden of responsibility for personal health on the people themselves and to place increasing emphasis on communal aspects.

## Marital status.

In Group I of the 3,322 males, 56·8 per cent are unmarried, 39·2 per cent are married and 3·9 per cent are widowers. The corresponding figures for the 3,066 female population are 39·4 per cent, 42·8 per cent and 17·8 per cent respectively. The difference in marital status of the two sexes is obvious, specially as regards widowhood. Average age at marriage for the girls is 11·3 and their early marriage explains the larger percentage of the married amongst them. Age at cohabit is 12·7 that is to say the husband and the wife do not generally live together for one and half years after the marriage. The average age at first pregnancy is 16 years, so a further period of three and half years relapses before the arrival of the first child. Analysis of the marital status in respect of age and sex is given in Table LXXIII.

TABLE LXXIII.

*Marital Status According to Age and Sex Amongst the Permanent Residents of the Area.*

Marital Status.	MALES.									FEMALES.								
	-5	-10	-15	-20	-25	-30	-35	35 +	Total.	-5	-10	-15	-20	-25	-30	-35	35 +	Total.
Unmarried . . .	470	499	448	287	132	34	11	7	1,689	488	478	228	14	..	..	..	..	1,208
Married . . .	1	..	1	12	124	105	236	734	1,303	..	2	64	211	293	233	185	323	1,311
Widower or widow .	..	..	..	..	2	..	4	124	130	..	..	..	8	16	27	49	447	547
TOTAL .	471	499	449	299	259	220	251	865	3,322	488	480	202	233	309	260	234	770	3,066

2

*Marital Status According to Age and Sex Amongst Persons Belonging to the Area but Normally Residing Outside.*

Marital Status.	MALES.									FEMALES.								
	-5	-10	-15	-20	-25	-30	-35	35+	Total.	-5	-10	-15	-20	-25	-30	-35	35+	Total.
Unmarried . . .	1	..	2	..	1	..	..	..	4	2	2	..	..	..	..	1	..	5
Married . . .	..	..	..	..	..	1	..	1	2	..	..	5	5	..	2	..	..	12
Widower or widow .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1
TOTAL .	1	..	2	..	1	1	..	1	6	2	2	5	5	..	2	1	1	18

*Marital Status According to Age and Sex Amongst Visitors.*

Marital Status.	MALES.									FEMALES.								
	-5	-10	-15	-20	-25	-30	-35	35+	Total.	-5	-10	-15	-20	-25	-30	-35	35+	Total.
Unmarried . . .	19	5	0	2	..	1	..	..	36	13	4	2	..	..	..	..	..	10
Married . . .	..	..	..	..	..	1	1	2	4	..	..	14	36	0	5	2	1	67
Widower or widow .	..	..	..	..	..	..	..	2	2	..	..	..	..	..	..	4	7	11
TOTAL .	19	5	0	2	..	2	1	4	42	13	4	16	36	0	5	0	8	97

A comparative study of the marital status of the two sexes is of interest. Attention has already been drawn to the disparity in the numbers of the widows and the widowers, the rates being 17·8 and 3·9 per cent of the population of the two sexes respectively. Above 15 years of age the corresponding figures are 30·3 and 6·8 per cent. These results follow from the social sanction amongst the Hindus of remarriage for men and not for women and from the custom of monogamy, even though the religion allows polygamy. The younger average age of widows as compared with that of the widowers is also manifest from the Table LXXIII. There is no widower below 20 years of age, but 1·5 per cent of the widows are less than 20 years old. The percentage of widows under 30 years is 9·4 as against 1·5 of the widowers. Looking at the problem from the point of view of the population growth it will be noted that 257 or 47 per cent of the widows belong to the reproductive period of life. This constitutes 17·0 per cent of the female population between age Groups 15 to 50. We shall revert to this subject presently.

Of the population below 20 years 18·6 per cent of the girls are married as against only 0·8 of the boys; 11·5 per cent of men still remain unmarried at that age. Age at marriage also differs significantly between the two sexes. While all the young women have married by the time they reach the age of 20, in the following quinquennial groups the unmarried amongst the males constitutes 51·3, 15·0, 4·3, 1·0, 0·55 and 0 of the male population in the corresponding age groups. Even above 55 there are 2 unmarried men.

**Births and deaths.**

Some information on this subject has been given in the Indices. Since these are events of considerable importance in the family a few remarks are-

offered here. Table LXXIV sets out certain information about births for families belonging to the Area according to their habitual place of residence and place of delivery.

TABLE LXXIV.

*Live Births, Still Births and Abortions by Families during the Year.*

Terminations.	GROUPS I & II.				GROUPS III & IV.		Total.	
	IN THE AREA.		OUTSIDE THE AREA.					
	No. of families.	No. of occurrence.	No. of families.	No. of occurrence.	No. of families.	No. of occurrence.	No. of families.	No. of occurrence.
Abortions . . .	5	5	0	0	0	0	5	5
Still-births . . .	0	0	1	1	0	0	10	10
Live-births—								
Male . . .	134	136	7	7	0	0	141	143
Female . . .	141	150	13	13	1	1	155	164
Total live-births . .	275	286	20	20	1	1	296	307
GRAND TOTAL .	280	300	21	21	1	1	311	322

The crude birth rate for Groups I and II works out at 41 per mille and the corrected birth rate at 43·8 per mille. Contrary to expectation, it is seen that people belonging to these villages have their babies born outside rather than returning to the village home for delivery, for in Groups III and IV only one out of the three expected births took place in the Health Centre Area, while in Groups I and II 21 or 6·6 per cent of the deliveries took place outside.

The abortion rate and still-birth rate for Groups I and II are 1·6 and 3·2 per cent respectively.

The sex ratio at birth according to the combined experience is 1 : 1·14, the female live-births being in excess.

One hundred and sixty-seven deaths occurred during the year in the sample population excluding the visitors, the information being collected for each family which included those belonging to the village but normally living

outside (*vide* Table LXXIV). The justification for the inclusion of Groups III and IV is firstly that the number of individuals constituting those groups is small being only 74 and because the exact period of residence in the village home of the family and outside for the deceased cannot be clearly determined. The crude death rate works out to be 22.8 and since no non-resident death occurred within the Area the corrected death rate is 23.7. These figures are not particularly high for a rural area in Bengal and in fact they are surprisingly low for the terrible famine year of 1943. But this is in keeping with the record of only one death from starvation in the sample population which means that in that year Singur area was not involved to the extent that high mortality may occur. From personal knowledge it may be stated that a number of deaths from starvation did take place in the following year.

Since no non-resident death occurred in the area the corrected death rate for the males is 28.9 and for the females it is 18.0. The difference between the death rates of the two sexes is striking. It is mainly due to the higher toll of male lives taken by malaria, dysentery and diarrhoea, pneumonia and tuberculosis, but the mortality amongst them is also higher for most other causes of death. While the male infants share proportionate excess mortality (*see* Table LXXV), it is the pre-school child and the adult and more particularly the aged males who have to bear the greatest brunt of disproportionately high mortality rate. If, therefore, an attempt is to be made to further reduce the death rate in this area special attention will have to be paid to the male population and more specially to the pre-school boys and the men of older age groups. The female mortality is higher only during the child-bearing period. These observations are in conformity with the higher morbidity rate amongst the males to which reference will be made later. The big four amongst the causes of death are in order—malaria, diarrhoea and dysentery, cholera and prematurity. Amongst others of importance may be mentioned fevers, pneumonias, typhoid and paratyphoid. The miscellaneous causes include among others deaths from marasmus, nephritis, child-birth, tuberculosis and ascites, other diseases are less important. Thus, special attention has to be paid to the control of malaria, dysentery and diarrhoea, pneumonia and to acute diseases like cholera.

Infant mortality is about 137. The sex specific infant mortality being 196 and 85 for the males and the females respectively, the former are again at a considerable disadvantage. The special reasons for higher rate amongst the former may also help to indicate lines along which endeavour could be made to reduce waste in early life. From the analysis of the causes of death, so far carried out, it would appear that multiplicity of causes are in operation but there are some indications of difficult labour as being one of the possible causes of higher infant mortality amongst the males.



TABLE LXXV.

*Deaths During the Year by Sex and Causes and Place of Occurrence, 1943.*

Cause of death.	MALES.			FEMALES.				
	No. of deaths in survey area.	No. of deaths outside.	Total.	No. of deaths in survey area.	No. of deaths outside.	Total.	Grand Total.	Rate per 100,000.
Malaria . . . . .	20	1	21	12	1	13	34	482
Diarrhea and dysentery . .	15	0	15	10	0	10	25	354
Cholera . . . . .	7	0	7	5	0	5	12	170
Prematurity . . . . .	5	1	6	4	1	5	11	156
Other fevers . . . . .	0	0	0	3	0	3	9	123
Pneumonia . . . . .	6	0	6	1	0	1	7	99
Typhoid and paratyphoid .	4	0	4	2	0	2	6	83
Marasmus . . . . .	3	0	3	2	0	2	5	71
Nephritis . . . . .	3	0	3	2	0	2	5	71
Accidents other than snake bite.	3	0	3	2	0	2	5	71
Child birth and anemia of pregnancy.	0	0	0	4	0	4	4	57
Tuberculosis . . . . .	4	0	4	0	0	0	4	57
Ascites . . . . .	2	0	2	2	0	2	4	57
Asphyxia neonatorum . .	3	0	3	0	0	0	3	43
Tetanus . . . . .	2	0	2	0	1	1	3	43
Senility . . . . .	2	0	2	1	0	1	3	43
Congenital debility and malformation.	1	0	1	1	0	1	2	28
Leprosy . . . . .	1	0	1	1	0	1	2	28
Syphilis . . . . .	2	0	2	0	0	0	2	28
Cancer . . . . .	1	0	1	1	0	1	2	28
Hemiplegia . . . . .	2	0	2	0	0	0	2	28
Smallpox . . . . .	2	0	2	0	0	0	2	28
Beriberi . . . . .	1	0	1	0	0	0	1	14
Diabetes . . . . .	1	0	1	0	0	0	1	14
Kala-azar . . . . .	0	0	0	1	0	1	1	14
Asthma . . . . .	1	0	1	0	0	0	1	14
Intestinal obstruction . .	1	0	1	0	0	0	1	14
Other respiratory diseases .	0	0	0	1	0	1	1	14
Well's diseases . . . . .	1	0	1	0	0	0	1	14
Acute Arthritis (Traumatic) .	0	0	0	1	0	1	1	14
Starvation . . . . .	1	0	1	0	0	0	1	14
Miscellaneous . . . . .	1	0	1	2	0	2	3	43
Cause unknown . . . . .	2	1	3	0	0	0	3	43
<b>TOTAL</b> . . . . .	<b>103</b>	<b>3</b>	<b>106</b>	<b>58</b>	<b>3</b>	<b>61</b>	<b>167</b>	<b>..</b>

TABLE LXXVI.

*Deaths During the Year by Cause, Sex and Age Groups (1943).*

Cause of death.	MALES.							FEMALES.							Grand Total.
	—1	—5	—15	—25	—55	55+	Total.	—1	—5	—15	—25	—55	55+	Total.	
Malaria . . .	2	7	1	1	4	6	21	1	3	3	1	3	2	13	34
Diarrhea and dysentery.	4	5	1	1	3	1	15	2	3	1	1	2	1	10	25
Cholera . . .	1	1	0	2	2	1	7	0	3	0	1	1	0	5	12
Prematurity . .	0	0	0	0	0	0	0	5	0	0	0	0	0	5	11
Other fevers . .	3	2	1	0	0	0	6	1	1	0	0	0	1	3	9
Pneumonia . . .	0	0	0	1	2	3	6	0	0	0	0	0	1	1	7
Typhoid & paratyphoid	1	2	0	0	1	0	4	1	0	0	0	0	1	2	6
Marasmus . . .	3	0	0	0	0	0	3	2	0	0	0	0	0	2	5
Nephritis . . .	0	0	0	1	1	1	3	0	0	0	1	1	0	2	5
Accidents other than snake bite.	0	2	0	0	1	0	3	0	0	1	0	0	1	2	5
Child birth and anemia of pregnancy.	0	0	0	0	0	0	0	0	0	0	3	1	0	4	4
Tuberculosis . .	0	0	0	1	2	1	4	0	0	0	0	0	0	0	4
Ascites . . . .	0	0	0	1	1	0	2	0	0	0	0	0	2	2	4
Asphyxia neonatorum	3	0	0	0	0	0	3	0	0	0	0	0	0	0	3
Tetanus . . . .	2	0	0	0	0	0	2	1	0	0	0	0	0	1	3
Senility . . . .	0	0	0	0	0	2	2	0	0	0	0	0	1	1	3
Congenital debility and malformation.	1	0	0	0	0	0	1	1	0	0	0	0	0	1	2
Leprosy . . . .	0	0	0	0	1	0	1	0	0	0	0	1	0	1	2
Syphilis . . . .	1	0	0	0	1	0	2	0	0	0	0	0	0	0	2
Cancer . . . . .	0	0	0	0	1	0	1	0	0	0	0	1	0	1	2
Hemiplegia . . .	0	0	0	0	1	1	2	0	0	0	0	0	0	0	2
Smallpox . . . .	0	1	0	0	1	0	2	0	0	0	0	0	0	0	2
Beriberi . . . .	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
Diabetes . . . .	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1
Kala-azar . . . .	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
Asthma . . . . .	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1
Intestinal obstruction	1	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Other respiratory diseases.	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Wells diseases . .	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1
Acute Arthritis (Traumatic).	0	0	0	0	0	0	0	0	0	1	0	0		1	1
Starvation . . . .	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1
Miscellaneous . . .	0	0	0	0	0	1	1	0	1	0	0	0	1	2	3
Cause unknown . .	0	0	1	0	2	0	3	0	0	0	0	0	0	0	3
TOTAL . . . . .	28	21	4	8	26	19	106	14	11	6	8	10	12	61	167

## Diet survey.

Rice is the staple food. Vegetables are grown extensively and are regularly consumed in season. Meat is rarely taken except by the richer section of the Muslim community and fish is eaten occasionally. Milk is scarce. Butter or *ghee* is a luxury rarely indulged in. Mustard oil is the only fat available and is sparingly used. Other articles of diet are *dals*, cocoanut, bananas and sugar or '*gur*'.

The survey was carried out in 30 sampled families by the diary method for 7 consecutive days mostly during May and June. On the first day an inventory was made of the food in stock by weighing. In certain families there were larger stocks of rice or paddy which could not be weighed. In such cases daily withdrawals were noted. For the next seven days records were kept of gain or loss (amount given to visitors or animals or thrown away). On the last day the stocks were again weighed and the amount of each article of food consumed during the week was calculated. Using the pamphlet issued by the Bengal Nutrition Committee the quantities of the proximate principles, minerals and vitamins contained in each item of food were estimated for the family. The consumption units in respect of each principle were determined for the individual families and the requirements calculated according to the recommendations of the Committee (*see Appendix Va & b*). The deficiency or excess was worked out. The distribution of families according to the deficiency or excess of the proximate principles, etc., is set out in Table LXXVII.

TABLE LXXVII.

*Frequency Distribution of Families According to Deficiency or Excess Consumption of Proximate Principles, Vitamins and Minerals and the Average Percentage of Deficiency or Excess over Requirements.*

Percentage Deficiency or Excess.	Calories.	Carbohy- drate.	Pro- tein.	Fat.	Ca.	Phos.	Fe.	Vita- min A.	Vita- min B <sub>1</sub>	Vita- min C.
50 Deficiency . . .	3	1	1	25	16	1	3	10	3	4
—50 Deficiency . . .	12	11	4	5	6	2	10	4	6	4
—25 Deficiency . . .	10	9	7	0	7	2	4	1	8	3
±5 . . . . .	3	1	5	0	0	5	0	0	2	0
—25 Excess . . . .	1	0	7	0	1	4	2	1	3	2
—50 Excess . . . .	1	2	4	0	1	7	7	0	1	1
50 Excess . . . . .	0	0	2	0	0	9	4	14	7	16
Total consumption of 30 families.	320048	63097 gms.	8031 gms.	3717 gms.	70158 mgm.	228221 mgm.	3702 mgm.	655 mgm.	196 mgm.	10301 mgm.
Total requirements .	452220	78818 gms.	9192 gms.	11270 gms.	132000 mgm.	177700 mgm.	3786 mgm.	588 mgm.	196 mgm.	9510 mgm.
Percent of Deficiency or Excess.	—29	—20	—3	—07	—47	+28	—2	+11	0.0	+71

The limitations which, for the reasons already given, these data impose on generalisation, are, to a certain extent, liable to be over-emphasised because the population is not too heterogeneous in respect of dietetic habits, the only exception being the small group of Mohammedans who use much more animal protein than the rest of the community. However, the seasonal changes would profoundly influence the nature and quality of food particularly because greater part of it is derived from home produce. From Table LXXVII it would appear that food is deficient in most of the essential factors which may now be considered separately and discussed in relation to the clinical findings.

*Calories.*—Twenty-five families are deficient in calorie intake, three are just able to get their bare requirements and only two are having more than their need though not to any great extent. The average calorie deficiency amounts to 29 per cent. This deficiency is mainly attributable to lack of fat and also to carbohydrates to a lesser extent. The low rating of general nutrition and poor standard in respect of weight and height of the Singur population is, therefore, not difficult to understand. This community is not on the verge of starvation but it is actually in the early stages of starvation.

*Carbohydrates.*—Vegetarian food is usually considered to be too rich in carbohydrates and it is surprising to see that even this principle which is the cheapest of all to obtain, is deficient to the extent of 20 per cent. Twenty-one out of 30 families are not getting the minimum requirements and one is just able to make it. Twelve families suffer from over 25 per cent deficiency of which 1 is not able to get even half the minimum requirements.

*Fats.*—As we have already pointed out this is the most serious deficiency. All but five families are not getting even half of the minimum requirements. The remaining five are deficient to the extent of 25 per cent or more. Average deficiency in fats amount to 67 per cent, i.e., on an average, a person is getting only one-third of what he should.

*Proteins.*—Protein requirements are just about met. However, in this respect the distribution is not so even. Only 5 families consume proteins within 5 per cent *plus* or *minus* of their requirements. Twelve are deficient of which one cannot procure even half of what it needs. On the other hand, 13 families use excessive protein diet, of which 2 use more than double the requirements. The proteins are almost wholly derived from vegetable sources and are therefore of poor biological value. Lack of biological proteins must have its share in the retardation of growth and development, particularly in the case of infants and young children (see pages 106-7, 110-1).

*Minerals.*—Calcium deficiency is general and serious. Half of the families do not get even half of their minimum requirements. In 13 other instances this mineral is moderately deficient. Low standard of height and weight due to poor skeleton development, and caries of the teeth (Seal, 1938) may be partly accounted for by calcium deficiency. Phosphorus intake on the other hand, is in excess, to the extent of 28 per cent, thus seriously upsetting the calcium-phosphorus balance.

In regard to iron the standards vary. We have adopted double the standard recommended for various stations of life by the Bengal Nutrition Committee as their standards may be considered too low by certain authorities. Even with this higher standard the average deficiency is only two per cent

and this does not take into account the iron contained in drinking water. However, 17 families are deficient, 3 being highly so. On the other hand, iron intake of 13 families is higher than the requirements. Four families take excessive amount. Looking back into the details of the sources of iron in the food of individual families, it appears that the disparity in iron intake is mostly due to differences in the amount of rice and green vegetables consumed. If, therefore, anæmia in this community is due to iron deficiency in food larger amounts of rice and green vegetables have to be provided for 39 per cent of the population which showed evidence of anæmia. At any rate, the anæmia problem in Singur requires more detailed examination that has been given to it so far.

*Vitamins.*—Vitamin A is also not evenly distributed in the diet of the different families. Ten families suffer from serious lack of vitamin A, 5 families have vitamin A deficiency to a lesser extent, and 15 families take more than what they need, 14 of whom have fairly rich vitamin A diet. The source of vitamin A is almost entirely the green leafy vegetables, which as we have suggested are not equally available to all families and in all seasons. It is also arguable whether the carotene which this article of diet supplies is all pro-vitamin A, and whether the physiological conditions necessary for the conversion of carotene into vitamin A are equally present in different individuals. These observations may explain why even with an average excess of 11 per cent vitamin A, 27 per cent of individuals exhibit signs of vitamin A deficiency.

*Vitamin B<sub>1</sub>.*—Families investigated show considerable heterogeneity as regards the consumption of this factor. Seventeen families exhibit deficiency, 3 of them markedly so, while 11 families take vitamin B<sub>1</sub> in excess of their requirements, 7 markedly so. However, clinical assessment brings out deficiency only in 1 per cent of the population and that too of a low degree. Apparently this is in accordance with the findings that on an average there is neither an excess nor deficiency of this vitamin. It may also be noted that there is no marked variation in the seasonal distribution of vitamin B<sub>1</sub> deficient people. From these observations it would appear that the vitamin B<sub>1</sub> requirements are either rated too high or the early signs of vitamin B<sub>1</sub> deficiency, *viz.*, loss of appetite and constipation, were not included. But these symptoms are difficult to elicit with certainty and still more difficult to be ascribed to nutritional defect.

*Vitamin C.*—In this case also there is considerable disparity amongst families. Sixteen families have rich vitamin C diet exceeding the requirement by 50 per cent. Three other families also take more than they need. However there are 11 families whose diet is deficient in vitamin C. The deficiency is over 50 per cent in four instances. The average excess of vitamin C is 71 per cent but as we have seen it is largely due to the excessive intake by 16 families. It is, therefore, not surprising that about 10 per cent of the individuals may exhibit slight deficiency in vitamin C.

It will be of interest to compare the above findings with the results obtained in a more recent study (January to March 1945) by one of us (S.C.S. in collaboration with P. C. Sen and G. Sankaran). These studies were carried out in four villages, *viz.*, Paltagarh and Biramnagar (Singur Union), Borai (Bora Union) and Baratajpur (Begumpur Union) comprising 122 families (see table LXXVIII).

TABLE LXXVIII.

*Frequency Distribution of Families According to Deficiency or Excess Consumption of Proximate Principles, Vitamins and Minerals and the Average Percentage of Deficiency or Excess over Requirements (1945 Survey).*

Deficiency or excess in %		Calo-ries.	Car-bohy-drate.	Protein.		Fat.	Ca.	P.	Fe.	Vita-min A.	Vita-min B <sub>1</sub> .	Vita-min C.
				Animal.	Vegetable.							
> 50 Deficiency.	No. .	30	12	75	11	46	60	18	0	23	13	5
	Per cent .	24.6	9.8	61.5	9.0	37.7	49.2	14.8	0.0	18.9	10.7	4.1
< 50 Deficiency.	No. .	25	24	21	5	17	18	18	8	12	19	15
	Per cent .	20.5	19.7	17.2	4.1	13.9	14.8	14.8	6.6	9.8	15.6	12.3
< 25 Deficiency.	No. .	18	25	0	15	13	9	9	3	14	14	14
	Per cent .	14.8	20.5	0.0	12.3	10.7	7.4	7.4	2.5	11.5	11.5	11.5
Balanced or excess.	No. .	49	61	26	91	46	35	77	111	73	76	88
	Per cent .	40.2	50.0	21.3	74.6	37.7	28.7	63.0	91.0	50.3	62.3	72.1

While deficiency in regard to calories, carbohydrates, fats, vitamin A, Vitamin B<sub>1</sub> and calcium are common to both investigations, in regard to frequency the conditions are better in the later survey, and there are fewer cases of extreme deficiency as regards fat, vitamin A and vitamin C, but not with regard to calories, phosphorus and vitamin B<sub>1</sub>. Unfortunately, it is not possible to compare protein and iron deficiencies, because in the former case calculations have been made separately for proteins of vegetable and animal origin and in the latter case a lower standard of normal requirements has been adopted in the more recent survey. Nevertheless, from general considerations it would appear that the frequency distributions of protein intake by various families may not be very different in the two surveys. The standard of iron adopted in the 1945 survey reduces the deficient families to less than 10 per cent whereas in our clinical assessment anæmia cases of nutritional origin amounted to 39 per cent. This proportion, for the reasons given on page 88, is probably an underestimate. While, as we have mentioned in that connection, the problem as regards the casual factors of anæmia should be treated with an open mind. The present data would suggest that the standard of iron requirements adopted by the Bengal Nutrition Committee may need revision.

With regard to the comparison made above between the results of the two surveys it should be remembered that besides the smaller number of families investigated in the general survey the reasons for the overall improvement observed later may be firstly that the second survey was conducted 8 to 9 months later by which time general improvement in food situation had taken place, secondly, this survey was carried out during January, February and March by which time the new rice crop had been harvested and green vegetables were in abundance, and thirdly, the selected families presumably belonged to higher economic strata since as we have seen in Chapter V the school children are drawn from relatively better class families and fourthly, in the later survey Baratajpur which is particularly a prosperous village and where the Muslim population which is used to better food is largely concentrated, was included. It might therefore be justifiable to suggest that the

general picture of dietetic habits of the community as a whole, as depicted in the General Health Survey, could not be far wrong for that period.

#### ECONOMIC CONDITIONS.

Knowledge of healthful living which carries conviction is no doubt prerequisite for the success of preventive and constructive medicine and to a great extent of curative medicine but little can be achieved unless it is backed by financial and other means at the disposal of the people. Poverty of Indian masses is proverbial and the low National Income has figured greatly in discussions. The problem is, however, a difficult one when the object of the study is to measure how health is handicapped through poverty. In estimating the economic conditions, we are therefore faced with the problem of selecting the items of information which have a bearing on health. Certain items readily occur to one's mind, for instance, expenditure on food, housing, medical advice and medicines, but other items like clothing, toilet, education, etc., may not have the same direct association with healthful living. Besides, there are other items in the family budget which may have still more remote bearing on health, and surely the expenditure incurred on account of, say, land taxes, manure, seed or labour charges in connection with cultivation or on travelling for business have little reference to health. For this reason, we have divided the expenditure under two main heads, namely, (a) on the consumption side and (b) on the production side; and the expenses under (a) have been further divided under various heads, such as food, fuel, house-rents, etc. Again, for each item of food an estimate has been made for home produce and for cash purchase. Thus it is possible to broadly relate the specific items of expenditure with health conditions of the family in general and in respect of any special states of health. This, however, is not the whole story for a given total expenditure, one item will necessarily influence the others. We cannot, therefore, altogether ignore the expenditure on production. Again, expenditure is largely dependent upon income. It is extremely difficult to broach the subject of income amongst ignorant and suspicious people. However, without that information it is difficult to say how far the family can continue to incur expenditure at the present rate. An estimate of income has, therefore, been made through information collected in an indirect manner and the credit or debit balance has been worked out. The families have been divided into three equal groups on the basis of annual *per capita* expenditure on the consumption side to indicate the general level of living standard. Each of these groups has been subdivided according to the financial stability at that level to obtain what we have termed the 'Index of Prosperity' (*vide* key to the family schedule).

The mean annual *per capita* expenditure on the consumption side is Rs. 165 S. D.  $\pm 56$  and the limiting values which divide the families of moderate means from the higher and the lower groups are Rs. 180 and Rs. 135 respectively. The minimum annual *per capita* expenditure incurred by a family amounts Rs. 26 and the maximum to Rs. 581. The index number of wholesale prices during the period of survey (*i.e.*, the first 7 months of 1944) averaged 239.8 and ranged from 236.3 to 244.2. The corresponding figures for the year 1943 are 228.2, 190.4 and 241.7 respectively. Reduced to the pre-war value the mean annual *per capita* expenditure (consumption) works out to 68.8 only. The distribution of families according to consumption level is shown in Table LXXIX.

TABLE LXXIX.

*Frequency Distribution of Families According to Expenditure on the Consumption side.*

All families graded at intervals of Rs. 10.			All families graded at intervals of Rs. 50.		
Consumption per capita.	Families.		Consumption per capita.	Families.	
	No.	Percentage.		No.	Percentage.
Below Rs. 100	55	10.7	Below Rs. 100	55	10.7
" " 110	20	3.9	" " 150	185	36.1
" " 120	37	7.2	" " 200	153	29.9
" " 130	43	8.4	" " 250	74	14.5
" " 140	41	8.0	" " 300	21	4.1
" " 150	44	8.6	" " 350	12	2.3
" " 160	35	6.8	" " 400	7	1.4
" " 170	32	6.3	" " 450	4	0.8
" " 180	34	6.6	" " 500	1	0.2
" " 190	20	5.7			
" " 200	23	4.5			
" " 210	24	4.7			
" " 220	18	3.5			
" " 230	16	3.1			
" " 240	9	1.8			
" " 250	7	1.4			
Rs. 250 +	45	8.8			
	512			512	

Thus poorer families predominate, the families most frequently met with being those with *per capita* consumption expenditure of Rs. 100 to Rs. 150. Of the 512 families studied as many as 338 or two-thirds belong to the group 100 to 200.

Of the various items of expenditure on the consumption side certain items have been selected as of special interest (*vide* Table LXXX).

TABLE LXXX.

*Mean Per Capita Annual Expenditure in Rupees on Certain Selected Items.*

	Food.			Education* Per capita of population.	Medical advice and medicines.	Total annual per capita consumption expenditure.
	Home products.	Cash purchase.	Total.			
Mean values	56.0	91.4	148.0	1.02	2.5	165
Percentage of total expenditure on consumption.	34.3	55.4	89.7	0.6	1.5	..

\* NOTE.—Per capita expenditure on education for children of school age is Rs. 3.06 only.



Food absorbs nearly 90 per cent of the total money value available for consumption and little is left for other expenses. Of the main items other than food, fuel and lighting, interest on loans and taxes take away the major part. Money spent on education is negligible but medicines and medical advice claim an appreciable share in the family budget. No comments are necessary to emphasise the point that sheer necessities to keep body and soul together take away all that the poor man can manage to spend on himself. This is not to say that he is able to satisfy his bare necessities for two reasons (1) His food is inadequate (see Tables LXXVII & LXXVIII) as a result of which his nutritional condition is anything but satisfactory (see also Charts 4 and 5). It should also be noted that more than 50 per cent of the available amount is spent on the purchase of food and difficulties arise when transport facilities and movement of the articles of food are restricted or disorganised as happened during the war. Bora Union being the least self-sufficient suffered most from essential lack of food. (2) The amount of indebtedness and consequent instability even at this low level is considerable as may be seen from Table LXXXI. Thus 40 per cent of the families and certainly over 20 per cent of them cannot obviously maintain the present rate of expenditure and are likely to deteriorate progressively. Only 11 per cent are fortunate to have a comfortable credit balance.

TABLE LXXXI.

*Frequency Distribution of Families According to Percentage of Credit or Debit Balance on Income.*

	Credit balance.		Balanced with- in $\pm$ 5% of credit or debit.	Debit balance.	
	15% or more.	5—15%.		5—15%.	15% or more.
No. of families	57	65	184	98	105
Percentage of total families investigated.	11.2	12.8	36.1	19.3	20.6

How recklessly some of them live may be exemplified by a family whose total annual income which included Rs. 600 as sale proceeds of ancestral land was Rs. 1,300 and expenditure Rs. 2,580.

The Index of Prosperity which combines both the standard of living and the stability has been worked out and the distribution of families in the various classes has been shown in Table LXXXII.

TABLE LXXXII.

*Frequency Distribution of Families According to Index of Prosperity.*

Consumption level.	Degree of stability.									
	Credit 15% or more.		Credit 5—15%.		Balanced $\pm$ 5%.		Debit 5—15%.		Debit 15% or more.	
	No.	%	No.	%	No.	%	No.	%	No.	%
Upper Third	27	5.3	20	5.1	51	10.0	26	5.1	39	7.6
Middle third	18	3.5	20	5.1	65	12.8	38	7.5	24	4.7
Lower third	12	2.4	13	2.5	68	13.4	34	6.7	42	8.2
Total per cent		11.2		12.7		36.2		19.3		20.6

The Table LXXXII shows that quite a high percentage of even the upper grade families is under debt and the financial condition of about 15 per cent and certainly of 8·3 per cent families who belong to the lower grade is beyond any hope of recovery.

The relationship of poverty and disease will be discussed elsewhere.

## CHAPTER VII.

### SPECIAL GROUPS.

We have briefly described the family organisation in its various bearings in Chapter VI. A number of special studies pertaining to certain stations of life suggest themselves in the course of this description. Some of them merit separate treatment as otherwise they would over-burden that chapter with inappropriate material, and would blur the general picture. We have, therefore, given additional space to information collected on certain addenda to the General Individual Schedule.

*The Married Women.*—The mother is the hub of the family life. It is in her womb that the foundations of life are laid. An intimate study of the married women in different places is required to understand the problems of health and disease concerning her, her progeny and the family as a whole. In the present survey we cannot enter upon such a detailed study because it requires continuous observations and specially designed investigation. Here we shall content ourselves with one aspect of material experience namely in its bearing on population growth.

*Age at marriage and age at cohabit.*—We have already seen that there is, on an average, an interval of one and half years between the age at marriage and the age at cohabit. However, as may be expected the period of postponement of cohabit after marriage regularly decreases as the age at marriage increases (*vide* Table LXXXIII).

TABLE LXXXIII.

*Relationship Between the Age at Marriage and the Age at Cohabit.*

Age at Marriage (in years).	Number.	Cumulative percentage.	Mid-point of class inter- val (in years).	Average age at cohabit (in years).	Period of post- ponement of cohabit after marriage (in years).
—10 . .	412	21.6	9	11.4	2.4
—12 . .	881	67.9	11	12.5	1.5
—14 . .	491	93.7	13	13.4	0.4
—16 . .	94	98.6	15	15.2	0.2
—18 . .	19	99.6	17	17.1	0.1
—20 . .	4	99.8	19	19.0	0.0
—25 . .	3	100.0	22.5	22.5	0.0

While the average interval between marriage and cohabit is about two and half years for the bride aged 9 years, it is decreased by a year for a bride two years her senior. It is reduced to *nil* if marriage is postponed to age of 19 years.

*Age at first pregnancy.*—We have noted that the average interval between age at cohabit and age at first pregnancy is three and half years.

Here again, in general the interval between age at cohabit and age at first pregnancy decreases with the age at cohabit (see Table LXXXIV). While in the first two age groups this interval is large, *viz.*, 5.9 and 4.7 years respectively, later on it is more or less uniform ranging between 2 to 3 years. In the case of three women who lived with their husbands after the age of 20 years, the average waiting period before the arrival of the first child was only

1·2 years, but the figure is small. It is rare for a pregnancy to occur between 14 and 15 years. It is not till 16 years of age that the largest number of first pregnancies occur. From this discussion it would appear that brides under 15 years are immature and marriages at that age should be discouraged. Here is an evidence in support of the view that minimum marriageable age fixed in the Sarda Act should be raised by at least one year.

TABLE LXXXIV.

*Relationship Between Age at Cohabit and Age at First Pregnancy.*

Age at cohabit (in years).	Frequency.	Cumulative percentage.	Mid-point interval (in years).	Average age at first pregnancy (in years).	Interval between age at cohabit and first preg- nancy (in years).
—10 . .	20	1·0	9	14·0	5·0
—12 . .	433	30·4	11	15·7	4·7
—14 . .	832	85·4	13	15·8	2·8
—16 . .	190	97·0	15	17·0	2·0
—18 . .	24	99·5	17	19·8	2·8
—20 . .	4	99·8	19	21·5	2·5
—25 . .	3	100·0	22·5	23·7	1·2

TABLE LXXXV.

*Relation Between Age at Marriage and Age at Widowhood.*

Age at marriage (in years).	Frequency.	Percentage.	Mid-point of age at marriage (in years).	Average age at widowhood (in years).	Average interval between marriage and widowhood (in years).
—10 . .	104	30·0	9	37·1	28·1
—12 . .	206	40·4	11	35·0	24·0
—14 . .	67	12·4	13	32·6	19·6
—16 . .	5	1·5	15	28·1	13·1
—18 . .	3	0·6	17	47·5	30·5
—20 . .	1	0·2	19	41·5	23·5

*Age at marriage and age at widowhood.*—Earlier marriage naturally exposes a girl to the risk of earlier widowhood. Table LXXXV which gives the information about the average age at widowhood against age at marriage fails to bring out this point. Considering only the first three classes according to age at marriage, it would appear that the average age at widowhood is between 32 and 37, irrespective of the age at which she married. The period of married life amongst those who become widows averages from 20 to 28 years. After deducting the prematurity period the remaining married life is insufficient to permit a woman to give expression to her full reproductive capacity, for we find that the average number of terminations under 35 years which is the average age at widowhood is only 5·5 as against the average of 6·7 for completed reproductive lives without loss of husbands. Thus a widow may be expected to contribute only about four-fifths of her quota of children. Since 29 per

cent of women become widows, the check on population growth on account of the customary prohibition of widow remarriage is not inconsiderable. Thus there is roughly 6 per cent reduction in birth rate from this cause alone. Taking differential fertility at various ages under consideration this calculation is subject to the objection, that due weightage has not been given to the age distributions of the women who did not become widows, and to the age distribution at widowhood. If, we apply the rates of contribution at various age groups of married women excluding widows to the widows at various age groups, we find that the total contribution of the widows would have been 261 as against 4,149 of women who did not become widows. In other words, the loss of reproduction due to widowhood amounts to about 6 per cent of what it would have been, if there had been no widows. This method of calculation is open to the objection that the present age of widow does not take into consideration the actual period of widowhood prior to the date of investigation. The present calculations assume a uniform period of 5 years of widowhood which is an underestimate and therefore loss of reproduction caused by widowhood as given above is also an underestimate. Both methods give us the same estimate which is, however, admittedly, an underestimate. Our data permits of a more accurate estimate being made but the elaborate calculations involved in this work have not being carried out.

*Inter-relation between certain social factors.*—Social customs may sometimes be related to economic conditions and it may be pertinent to ask whether the average age of women at marriage, for instance, is related to economic circumstances of the family. This does not appear to be the case, in the community under discussion. As between the three economic groups mentioned in Chapter VI the difference in the average marriage age is not significant, being 11·2, 11·6 and 11·2 respectively for Groups I, II and III.

While the economic condition does not materially influence the age at marriage, education seems to do so, the average age at marriage for the illiterates being 11·3 and for the literates (which includes the few girls with higher education) 12·6; the difference is significant.

In Table LXXXVI is shown the average number of terminations per married women inclusive and exclusive of widows and also for women (excluding widows) who have completed their reproductive period.

TABLE LXXXVI.

*Average Number of Terminations For Married Women Inclusive and Exclusive of Widows and for Completed Reproductive Life.*

Average No. of termination per married woman	Average No. of terminations per married women excluding widows.	Average No. of terminations per woman with completed reproductive life (including widows).	Average No. of terminations per woman for those who have completed their reproductive period (excluding widows).
3·5	3·4	5·5	6·7

NOTE.—Since this was written specific fertility rates for each year of mother's age have been calculated and it has been found that the loss of reproduction rate due to widowhood is 15 per cent. (See Mathen and Lal, 1947.)

Though the difference is small the lower average number of terminations seen in column 2 as compared with column 1 is explained by the fact that the widows contain proportionately lesser number of women of immature age. It may be stated here, that these estimates are probably below the actual, because some abortions might have been missed. More detailed information as regards the progress of fertility with age is given in Table LXXXVII.

TABLE LXXXVII.

*Number of Terminations and Specific Fertility Rates For Women of Different Categories.*

Category.	Quinquennial age periods.								
	-15	-20	-25	-30	-35	-40	-45	-50	50+
1. No. of women . . . . .	83	247	316	265	243	152	150	92	365
Average No. of terminated pregnancies for all married women.	0.02	0.00	1.0	3.4	4.7	5.2	5.0	5.4	5.5
Specific fertility rates per woman, for quinquennial period.	0.02	0.58	1.3	1.5	1.3	0.5	..	0.2	0.1
2. No. of women . . . . .	93	240	300	238	190	105	100	44	77
Average No. of terminations for married women excluding widows.	0.02	0.50	1.00	3.63	5.40	5.80	6.22	6.48	6.72
Specific fertility rates per woman, for quinquennial period.	0.02	0.54	1.43	1.64	1.83	0.43	0.33	0.20	0.24
3. No. of women . . . . .	..	433	348	295	245	580	..	..	..
Average No. of terminated pregnancies including widows making adjustment for the period of widowhood.	..	0.40	2.03	3.53	5.15	0.00	..	..	..
Specific fertility rate per woman, for quinquennial period.	..	0.40	1.03	1.50	1.62	0.85	..	..	..
4. No. of women . . . . .	83	252	317	266	242	152	106	92	373
Specific fertility rate on the basis of deliveries in 1943 per woman for quinquennial period.	0.06	1.00	1.47	1.24	0.93	0.63	0.27	0.11	0.02

One of the main purposes for which maternity history is employed, is to gain knowledge about the contribution that the women may make towards probable increase or decrease of population in the near future. We have two sets of information from which this knowledge may be gained, *viz.*, (1) the number of terminations for each woman up to the date of investigation and (2) the results of deliveries during the year 1943. In both cases the abortions and still-births are included but their number is small and these are not likely to seriously influence the main conclusions. The data are included in Table LXXXVII.

In order to give a visual idea of the progressive number of terminations with advancing age the above data have been shown in Chart 6. It will be remembered that the number of terminations given in the Chart include abortions and still-births. Probably these are under-estimates, as some abortions are likely to have been missed. However, the curves are fairly-

regular, and more so when the widows are excluded, or the widows and their terminations up to the age of widowhood have been taken into consideration. The inclusion of widows and their terminations lowers the curve. We have already made some comments in this connection (see page 100). An additional reason may be the reduced contribution to reproduction by the husband during the period of sickness preceding death. At any rate it would be interesting to compare these curves with similar curves if they can be obtained for other communities. In Table LXXXVIII are shown the fertility rates *per thousand per annum* calculated in three different ways referred to above. For purposes of comparison similar data has been included for the Ukrain, Bulgaria and Sweden.

TABLE LXXXVIII.

*Comparative Statement of Specific Fertility Rates per Thousand per Annum for Singur and for the Ukrain (1926-27), Bulgaria (1921-26) and Norway (1874-76).*

Age Group.	10-15	20	25	30	35	40	45	50	50+
Singur all married women	4	116	260	300	260	100	20	20	20
Singur women excluding widows	4	108	280	328	366	86	66	52	48
Singur women, 1913 experience only	12	218	204	208	186	120	54	22	4
Ukrain	..	41	237	259	221	158	93	25	..
Bulgaria	..	35	216	273	209	151	79	36	..
Norway	..	7	101	209	230	212	135	31	..

Comparisons given in Table LXXXVIII are interesting. In foreign countries the data include all women married or unmarried and births whether legitimate or illegitimate. Besides, by the term 'termination' live-birth only is usually implied. In the present investigation the termination includes, though as we have already observed, not fully, the abortions and still-births. Again, we have included unmarried women and the question arises as to what extent the Singur data presented here are on par with the data of the foreign countries and in fact objection may be taken to the use of specific fertility rate as applied to the Singur data for the reasons given above. However, in actual fact, abortions were rarely recorded, and still-births were very few; we do not think that the inclusion of abortions and still-births really introduces any material error. During the year 1943, of a total of 322 terminations recorded there were only 5 abortions and 10 still-births, and it should be remembered that these data relate to immediate past. Abortions or even still-births occurring years ago are mostly forgotten. As we have observed previously, all women above 20 are married and thus the married women and total number of women are synonymous. Between 15 and 20 years the married women constitute 94 per cent of the population, and for the sake of uniformity we may neglect the unmarried six per cent because unlike foreign countries they are not exposed to the risk of pregnancy. It is true that between 10 and 15 years the percentage of married women is 21.9 only, and the inclusion of unmarried girls in the group would entirely change the fertility

rate, but the above argument applies here with greater force. On the whole the figure given in the table presents a better measure of fertility rate for girls between 10 and 15 years than the one calculated in conventional manner. In any case, no comparative figures for foreign countries are available. However, there remains another important point for consideration, *viz.*, the inclusion amongst the married women of widows who constitute as much as 29 per cent of women but who do not make any contribution towards reproduction. Against this, we have the fact that in foreign countries unmarried women are included in the estimates of the specific fertility rate. The proportion of unmarried women may vary from country to country. In any case, their inclusion in the calculation justifies the inclusion of widows in our calculation for purposes of comparison. With the above introductory note we may compare the data presented in Table LXXXVIII. The point to note is that the Singur women make most of their contribution in earlier age groups than their European sisters, particularly those of Norway. Clear change in this respect occurs at the quinquennial period, 35—40. Since the proportion of younger woman in Singur population is also higher it stands to reason that a successful attempt towards the postponement of marriage by a couple of years beyond the maturity age would materially lower the total fertility rate whatever other advantages—social, cultural and biological—such a reform may bring about in its train.

In the light of the above discussion it may be interesting to compare the Reproduction Rates calculated from our data (1943) with those of other countries (*vide* Table LXXXIX).

TABLE LXXXIX.

*Gross and Net Reproduction Rates for Singur (1943) and Certain Other Countries.*

Country.	Gross Reproduction Rate.	Net Reproduction Rate.
Singur (1943) . . . . .	2.940**	1.130**
*Ukraine (1926-27) . . . . .	2.185	1.076
*Bulgaria (1926-27) . . . . .	..	1.446
†Norway (1911-20) . . . . .	..	1.365
†Italy (1931) . . . . .	..	1.200
†European Russia (1896-97) . . . . .	..	1.650
*Denmark (1926-36) . . . . .	1.165 (including illegitimate)	1.012
*Australia (1932-34) . . . . .	1.047	0.955
*France (1935) . . . . .	1.003	0.866
*Sweden (1931) . . . . .	0.816	0.727
*Germany (1933) . . . . .	0.801	0.698
*England (1935) . . . . .	0.800	0.704
*U. S. A. (1933) . . . . .	1.044	0.040
*Japan (1920-31) . . . . .	2.324	1.540

\* Quoted from *Population and Fertility* by D. V. Glas and C. P. Blacker, The Population Investigation Committee.

† Measurement of Population Growth by R. B. Kuczynski 1935.

\*\* The sex ratio at birth and the life table for the whole of Bengal (1931 Census) have been used for calculations.



According to this calculation the Net Reproduction Rate for Singur is a moderate one. This is only a tentative conclusion because estimates based on one year's experience of a small area are liable to error and the figures of Net Reproduction Rate quoted above are 15 or more years old for some countries. According to more recent calculations (1935) the Net Reproduction Rates for most countries are considerably lower; thus the Ratio have been reduced to below 0.8 for Norway and to below 1.4 for the Ukrain in 1935.

While the present experience may not justify much concern over the rate of growth of population, the great difference between the Gross and the Net Reproduction Rates for Singur as compared with the other countries points towards the excessive waste of life which takes place between birth of the girl babies and their reaching maturity. The Ukraine and Japan are the only other countries presenting similar differences but not of the same magnitude as Singur.

*Antenatal service.*—A considerable amount of mortality to which reference has just been made occurs in infancy. Infant mortality is 137 and neonatal mortality is 75. The latter may be considerably reduced by efficient antenatal and natal care. Women's history concerning the antenatal care, has not been collected satisfactorily for 1942; but for 1943, 292 histories have been completed against 322 known terminations. The history of deliveries are recorded in the family schedules even when the woman is not present at the time. This would explain missing histories regarding antenatal cares in 26 instances. The 1942 records are available for only 194 women which evidently indicates large number of omissions. Unfortunately this part of the enquiry is unsatisfactory due partly to the lack of training of the investigators and partly to the unwillingness on the part of women to give information. In future enquiries, therefore, special effort should be made to employ female workers to whom this part of the work may be entrusted and adequate training should be given specially, if male workers are engaged. Combining the information for the two years, statement of antenatal care in relation to the kind of termination is given in Table XC. There were 4 abortions, 12 premature live-births, 10 still-births, 461 full term live deliveries, 6 full term still-births and one twin birth. Exact information for 12 other cases was not recorded. In majority of cases antenatal care was rendered by non-medical agencies, only 21 were attended by medical personnel. Only 5 women attended clinics and 321 were attended to at home. Although full instructions as regards classification of adequacy of antenatal care were given in the addendum itself, the investigators failed to follow them, and the records are unreliable for this analysis. At most 5 women could have received adequate antenatal care. Even this is unlikely because adequate antenatal care has been defined as one complete physical examination; one other visit to the clinic and at least 3 home visits. As we have seen, home visits were made in fairly large proportion of cases but this has little significance. Under the circumstances, it is neither possible nor desirable to enter into any discussion regarding the value of antenatal care but the results of delivery according to the care received are given in Table XC. It is hoped that in future surveys carried out after the antenatal care service has been organised some light will be thrown on the value of this service in preventing the risk to the mother and to the child and possibly in rendering benefit of permanent value to the newborn. In this connection one should not lose sight of the fact that the

problem of estimating the value of antenatal care would require considerable analysis so as to eliminate the influence of other factors.

TABLE XC.

*Antenatal Care Received and the Nature of Termination.*

Antenatal care received.	Nature of Terminations.					Total.
	Abortions.	Premature.		Full term.		
		Dead.	Alive.	Dead.	Alive.	
Attendance at Clinic . . . .	0	0	0	0	5	5
Attendance at house . . . .	1	7	9	6	298	321
Nil . . . . .	3	3	3	0	153	167
Total . . . . .	4	10	12	6	461	493

Of the 21 cases in which expectant mothers were attended by the medical personnel in the prenatal period, 19 resulted in live-births and 2 in premature births. Three of these infants died. In the group of 279 cases in which the mothers were attended to by non-medical agencies 1 terminated in abortion, 6 in premature still-births, 6 in premature live-births, 4 in full term still-births and 262 in full term live-births. Of these 35 infants subsequently died. There is no significant difference in the survival of the infants between the two groups.

*Post-partum service.*—Information is available for 297 women who delivered in 1943. Twelve of them received attention from medical personnel, 23 from non-medical trained agency and 158 untrained persons. No service was rendered to 104 mothers. Only 18 women were adequately attended to which means that they received a visit from a health visitor or a certified midwife within 48 hours of delivery and at least 3 more visits subsequently. In 17 cases the service was inadequate, that is to say that one or the other of these conditions was not satisfied. In the remaining cases post-partum service was negligible or nil. Thus, much remains to be done in the field of domiciliary midwifery which is necessary for bringing about a reduction in maternal and neonatal deaths and for prevention of damage at birth.

### PREGNANT WOMEN.

*General Health.*—There were altogether 73 pregnant women of whom 60 looked healthy, 9 were obviously pale and 4 were oedematous. The discovery of 18 per cent of sickly women amongst them, on inspection only, calls for further investigation.

Antenatal care was being given to only 2 out of 73 pregnant women contacted. One of them had not yet completed the 6th month of pregnancy and the other was between 6 and 7 months. The distribution of the month of gestation from under 4 months onwards was fairly even except for a clumping together of pregnancies between 8 and 9 months; also there were only 2 women in 9 months of gestation (see Table XCI).

TABLE XCI.

*Distribution of Pregnant Women According to the Month of Gestation and Antenatal Care Received.*

Antenatal Clinic.	Month of gestation.									Total.
	-2m	-3m	-4m	-5m	-6m	-7m	-8m	-9m	10m	
Yes . . . . .	.	..	..	..	1	1	..	..	..	2
No . . . . .	1	.	10	8	8	12	11	18	2	71
Total	1	..	10	8	9	14	11	18	2	73

From the administrative point of view it is of importance to know the distribution of pregnant women by villages. During the period of 7½ months when the survey was conducted 73 pregnant women were discovered. However, since villages were not revisited for purposes of contacting women who might have become pregnant after the visit to the village, and because the information relates only to the sample population, it cannot serve the purpose stated above. Of the 92 villages or parts of the villages which were separately numbered, pregnant women were contacted in 40 only. In the selected families of 20 villages there was only 1 pregnant woman, in 11 instances there were 2 each, in 5 instances 3 each, and in 4 instances 4 each. Similar analysis for the whole population should be of value.

Subjective symptoms were absent in 55 per cent of pregnant women. Tired feeling was complained of by 26 per cent, headache by 18 per cent, sleeplessness by 11 per cent, pain by 14 per cent, fever by 7 per cent, cough by 4 per cent and other complaints by 6 per cent. Thus tired feeling, pain and headache and in some cases sleeplessness are the main complaints. It has not been possible in this survey to relate symptoms with physical signs. Further analysis shows that primipara experience the subjective symptoms more frequently than the multipara, and this is so with respect to each of the complaints recorded here except headache which is more frequent amongst the multipara. In general appearance there is no difference between the primipara and multipara. The data are too small for more detailed analysis in relation to parity. While paleness may appear quite early in pregnancy, oedema is not common in that period.

#### INFANT.

On relinquishing his dependent existence in the mother's womb the newborn baby is subjected to the combined influences of his recent intrauterine experiences, his perilous journey to the outer world and the environment to which he is now exposed. Apart from the immediate risks of his life and well-being much of his new experience during the first year of life has a more or less permanent effect on later life. In a general health survey we cannot assess the nature of these various forces. All that we can hope to do is to touch upon certain important aspects of the baby's environment and on the progress in his development. Further remarks as regards illness and the factors associated with it will be found in Chapter XI.

*Place of birth.*—The information is available for 258 infants. Of these 239 were born in the village and 19 outside the Health Centre Area. All but four babies, out of 256, for whom information is available, were born at home, two women were delivered in the Maternity Home at Singur, one in Singur hospital and one in a hospital outside. Thus institutional deliveries are not popular.

TABLE XCII.

*Distribution of Deliveries According to the Agencies.*

	Agencies.						Total.
	Doctor.	Health Visitor.	Midwife.	Dai.	Relative.	Nono.	
No. . . . .	4	4	10	160	78	3	259
Percentage . . . .	1.5	1.5	3.9	61.8	30.1	1.2	..

As may be seen from table XCII, Dais attend over three-fifths of the deliveries (62 per cent). No professional assistance is called for in one-third cases of which 1 per cent are unaided deliveries. Professional service of doctors, health visitors and midwives is availed of in 7 per cent of cases only.

In regards to domiciliary service opinions are divided. One view is that the Health Agency should try and contact the pregnant woman as early as possible, arrange for thorough examination, popularise the clinic visits to give advice and provide antenatal supervision. By doing so the abnormal conditions likely to complicate delivery could either be corrected or cases sent for institutional treatment and deliveries. Normal labour could be left to the trained dais who would understand that cleanliness was all that was needed and undue interference cannot do any good but might do harm.

The other view is that "a friend in need is a friend indeed!" Therefore the popular demand of professional assistance at the time of delivery even in normal cases should be met to allay the anxiety of the mother and relations and thus ensure co-operation in carrying out other public health policies. It remains to be seen which of these views ultimately prevails and with what results.

TABLE XCIII.

*Distribution of Postnatal Attendance According to the Agencies.*

	Agencies.						Total.
	Doctor.	Health Visitor.	Midwife.	Dai.	Relation.	Nono.	
No. . . . .	6	16	8	76	82	72	257*
Percentage . . . .	2.3	6.2	3.1	29.6	31.9	28.0	..

\*The number of infants included in the table was 257. In three instances more than one agency attended.

Table XCII provides informations about postnatal attendance. It will be observed that the mother receives no assistance in 28 per cent cases and only the help of the relatives in another 32 per cent cases, dais visit postnatally in 30 per cent and health visitors in 6 per cent of cases. Attendance by midwives and doctors are less frequent as they attended only 3 per cent and 2 per cent cases respectively.

The weight at birth is rarely taken. In the present series only 2 babies were weighed, one being 6 lbs. and the other 7 lbs.

All the infants were fortunate in having their mothers alive during infancy. From table XCIV it will be seen that about two-thirds of the babies below 11 months of age are entirely breast fed and the remaining one-third receive cow's milk, in addition to mothers' milk. In two instances, the supplementary milk used is dry milk. In four cases the infant receives supplementary milk before the age of 3 months presumably due to the insufficiency of mother's milk, an equal number do so between 3 and 4 months. As their age advances more or more babies take outside milk in addition to mother's milk, and after 10 months the number of such infants is greater than those entirely on breast.

TABLE XCIV.

*Distribution of Infants According to Age and Milk-feed.*

Milk-feed.	Age in week.	Age in month.											Total.	Percent.
	1 <sup>st</sup> w.	1 <sup>st</sup> m.	2 <sup>nd</sup> m.	3 <sup>rd</sup> m.	4 <sup>th</sup> m.	5 <sup>th</sup> m.	6 <sup>th</sup> m.	7 <sup>th</sup> m.	8 <sup>th</sup> m.	9 <sup>th</sup> m.	10 <sup>th</sup> m.	11 <sup>th</sup> m.		
Mother's only . . . .	2	0	12	22	26	16	12	13	12	13	8	21	173	66.3
Mother's and fresh . . .	0	0	0	4	4	7	7	12	7	9	7	29	86	33.0
Mother's and dry . . . .	0	0	0	0	0	0	0	0	1	0	1	0	2	0.8
Total . . . . .	2	9	12	26	32	23	19	30	20	22	16	50	261	

*Other feeds.*—Over three-fourths of the babies do not receive any food other than milk. Fifteen per cent get cereals and 8 per cent sago. Fruits and green vegetables are rarely given. Two infants received cereals or sago early as under three months and 7 others before they were six months old. This is not desirable because at such an early age they cannot digest starch.

TABLE XCV.

*Distribution of Infants According to Age and Other Feeds.*

Other foods.	Age in week.	Age in month.											Total.	Percent.
	1 <sup>st</sup> w.	1 <sup>st</sup> m.	2 <sup>nd</sup> m.	3 <sup>rd</sup> m.	4 <sup>th</sup> m.	5 <sup>th</sup> m.	6 <sup>th</sup> m.	7 <sup>th</sup> m.	8 <sup>th</sup> m.	9 <sup>th</sup> m.	10 <sup>th</sup> m.	11 <sup>th</sup> m.		
N <sup>o</sup> . . . . .	2	9	12	23	30	22	15	25	15	14	11	21	199	74.8
Cereals . . . . .	0	0	0	1	2	0	2	3	3	7	2	20	40	15.0
Sago . . . . .	0	0	0	1	0	1	2	2	2	1	2	11	23	8.3
Fruits . . . . .	0	0	0	0	0	0	0	0	0	0	0	3	3	1.1
Green vegetables . . . .	0	0	0	0	0	0	0	0	0	0	1	1	2	0.8
Total . . . . .	2	9	12	25	32	23	19	30	20	22	16	56	266	

*Teeth.*—According to the American standard, two lower central incisors erupt between 5 to 9 months and the two upper central incisor come out between 8 and 12 months. It is generally believed that, in this country, teeth begin to erupt from 6 months onwards and making allowance for one month's delay, we should expect that majority of 132 babies above 6 months of age to have cut 1 to 4 teeth. One should at least expect that half of the 50 infants between 6 and 8 months and all the 82 infants between 8 and 11 months, i.e. 107 out of the 132 infants between 6 and 11 months should have cut some teeth. Actually, only 45 or 42 per cent of the expected number possess one or more teeth (*Vide* table XCV(A)). Again, if we expect the eruption of at least one tooth between 6 and 8 months, two between 8 and 9 months, three between 9 and 10 months and four between 10 and 11 months the 132 babies should have had 296 teeth between them. Actually the number is 210. Thus, we find that tooth eruption is much delayed amongst Singur babies. However, some infants have erupted a fair number of teeth—five teeth in five cases, 6 teeth in 6 cases, 7 teeth in 1 case, 8 teeth in 5 cases and 9 teeth in 2 cases before completing 11 months. We have no information, as to when they cut their first tooth.

TABLE XCV(A).

*Distribution of Infants According to Age and Eruption of Teeth.*

Teeth.	Age.												Total.
	—1wk	—1m	—2m	—3m	—4m	—5m	—6m	—7m	—8m	—9m	—10m	—11m	
0 . .	2	9	10	25	31	23	19	30	20	10	5	13	206
1 . .	0	0	0	0	0	0	0	0	0	1	0	2	3
2 . .	0	0	0	0	0	0	0	0	0	0	2	3	5
3 . .	0	0	0	0	0	0	0	0	0	1	0	0	1
4 . .	0	0	0	0	0	0	0	0	0	0	3	14	17
5 . .	0	0	0	0	0	0	0	0	0	1	1	3	6
6 . .	0	0	0	0	0	0	0	0	0	0	1	5	6
7 . .	0	0	0	0	0	0	0	0	0	0	0	1	1
8 . .	0	0	0	0	0	0	0	0	0	0	1	4	5
9 . .	0	0	0	0	0	0	0	0	0	0	0	2	2
Total .	2	9	10	25	31	23	10	30	20	22	13	47	251

*General Development.*—None of the infants below 3 months could hold up the head and only 5 out of 32 could do so when they were between 3 and 4 months (*vide* Table XCV(B)). Out of the 42 infants between 4 and 6 months 13 were able to hold up their head, which they were expected to do, at the age of 4 months. Nineteen out of 68 infants were more advanced than average in as much as they were able to sit without support before they were 10 months old. However, out of the 50 infants between 10 and 11 months who should have been able to sit up, only 37 could do so. None of the babies was able to crawl before he was nine months old and the first baby to crawl is between

9 and 10 months. Altogether only 7 babies out of 50 children between 10 and 11 months were advanced enough to crawl or do better. In the whole series only one infant was able to walk with support and 3 others could walk without support. Thus on the whole the development of this group of children was subnormal.

How far sickness retards growth we are unable to say, except that 63 of this 258 children were unwell. But comparisons of the sick and the non-sick for the same age does not suggest that sickness during the year had directly affected their development and it would not be far wrong to say that other causes, whether nutritional or not, are operative.

TABLE XCV(B).

*General Development of Infants.*

Age in months.	No.	General development.						
		Head.		Sit.	Crawl.	Stand without support.	Walk with support.	Walk without support.
		Cannot hold up.	Can hold up.					
—1 wk . . . . .	2	2	..	..	..	..	..	..
—1 month . . . . .	9	9	..	..	..	..	..	..
—2 months . . . . .	12	12	..	..	..	..	..	..
—3 months . . . . .	25	25	..	..	..	..	..	..
—4 months . . . . .	32	27	5	..	..	..	..	..
—5 months . . . . .	23	19	4	..	..	..	..	..
—6 months . . . . .	19	10	9	..	..	..	..	..
—7 months . . . . .	30	7	22	1	..	..	..	..
—8 months . . . . .	20	3	13	4	..	..	..	..
—9 months . . . . .	22	3	12	7	..	..	1	..
—10 months . . . . .	14	2	5	5	1	..	..	..
—11 months . . . . .	50	2	11	28	4	2	..	3

*PRE-SCHOOL CHILD.*

Like the infant the toddler also claims special consideration because it is during this period of life that he attempts to stand on his own feet both literally and metaphorically. He is physically and physiologically protected by the mother in infancy, as he finds his feet he comes in contact with the world outside his mother's lap and faces new risks. We shall deal with sickness in a later chapter. Here we shall confine ourselves to certain general aspects of the toddler's life pertaining to the food problem following weaning and to general development.

Breast feeding should stop at 10 months but 43.2 per cent of the toddlers in Singur have not yet been completely weaned. From table XCVI it would appear that only 5 per cent had completed weaning before their first birthday. The process is very slow, and the most common age at which breast feeding stops is two years. This is largely due to the fact that parents cannot afford cow's milk as may be seen from table XCVII.

TABLE XCVI.

*Distribution of Pre-School Children According to Age at Weaning.*

	Not yet weaned.	Age at weaning.										Total.	
		—6m	—9m	—12m	—15m	—18m	—21m	—24m	—27m	—30m	—36m		36m +
No. . . . .	320	7	8	22	10	60	13	165	67	21	20	19	741
Per cent . . . .	43.2	0.9	1.1	3.0	1.3	8.1	1.8	22.3	9.0	2.8	3.0	2.6	.

TABLE XCVII.

*Distribution of Pre-School Children According to Age and Quantity of Milk Feed.*

	Age.								Total.	
	—2 yrs.		—3 yrs.		—4 yrs.		—5 yrs.			
	No.	%	No.	%	No.	%	No.	%	No.	%
All . . . . .	62	38.0	87	40.8	102	57.3	130	60.7	361	51.4
—10 oz. . . . .	85	52.1	77	41.4	50	33.1	08	31.8	230	39.0
10 oz. and over . .	16	9.8	22	11.6	17	9.6	16	7.5	71	9.6

TABLE XCVIII.

*Distribution of Pre-school Children According to Age and Regularity of Milk.*

	Feeding Age.				Total.
	—2 yrs.	—3 yrs.	—4 yrs.	—5 yrs.	
Regular . . . . .	75	71	41	52	239
Total No. . . . .	168	186	178	211	741
Per cent of Regularity . . . .	40.0	38.2	23.0	24.3	32.3

It will be seen from table XCVII that 38 per cent of children between 1 and 2 years, 47 per cent between 2 and 3 years, 57 per cent between 3 and 4 and 61 per cent between 4 and 5 receive no milk at all; 52 per cent, 41 per cent, 33 per cent and 32 per cent for the above mentioned age groups respectively receive less than 10 oz. of milk. Eight to 12 per cent are given more than that quantity, at different ages (see Table XCVII). One must not, however, forget that all children who are fortunate enough to get some milk do so every day. Only 46 per cent, 38 per cent, 23 per cent and 24 per cent of children between 1 and 2, 2 and 3, 3 and 4 and 4 and 5 years respectively have regular milk feeds. (See table XCVIII.)



What is missed because of scarcity of milk is not always made up by other articles of diet rich in biological proteins (see tables XCIX and C). Less than 2 per cent of children under two years get meat and that too occasionally, none of them take any egg and more than half (54 per cent) do not take any fish. Thirty one per cent eat fish occasionally and 15 per cent twice a week or more often. Only 40 per cent of these young children take green vegetables daily and another 31 per cent have them less frequently. Fruits are more scarce, only 6 per cent are able to get some fruit twice a week or more often, and 31 per cent less frequently. About 22 per cent of them do not even have cereals. Between 2 to 3 years the child has a somewhat better chance of getting meat occasionally and about 71 per cent of them have fish though only 20 per cent are lucky enough to have it twice a week or more frequently. Some six per cent may have eggs occasionally. Green leafy vegetables are commonly taken (88 per cent) but they are available daily to only 56 per cent. About 53 per cent have some fruit. Barring 6.5 per cent cereals are taken by all. When the child gets a little older that is between 3 and 4 years his chances of getting meat, fish and eggs improve, as 12 per cent may have meat though only occasionally, nearly 91 per cent eat fish and 9 per cent eggs. Green leafy vegetables and cereals are available to all but 2.3 per cent and half the children also get fruit. All children between 4 to 5 years have cereals and practically all of them have green leafy vegetables; fruits are available to about 56 per cent. Meat is taken by some 14 per cent and fish by 94 per cent though occasionally in most instances, but eggs are available to only 13 per cent mostly less than twice a week.

TABLE XCIX.

*Distribution of Pre-School Children According to Age and Intake of Vegetable Food..*

		Age.							
		—2 yrs.		—3 yrs.		—4 yrs.		—5 yrs.	
		No.	%	No.	%	No.	%	No.	%
Vegetable food	Nil . . .	35	21.6	13	6.5	4	2.3	0	0
	Cereals . . .	127	78.4	174	93.5	174	97.7	214	100.0
Green vegetable	Nil . . .	15	28.1	21	11.6	4	2.3	2	0.9
	Less than daily . . .	51	31.9	58	32.0	31	17.6	23	10.7
	Daily . . .	64	40.0	102	56.4	141	80.1	189	88.3
Fruit	Nil . . .	100	62.9	87	47.5	93	52.5	94	44.1
	Less than twice a week . . .	49	30.8	88	48.1	77	43.5	102	47.9
	Twice a week or more . . .	10	6.3	8	4.4	7	4.0	17	8.0

TABLE C.

*Distribution of Pre-School Children According to Age and Intake of Non-Vegetarian Food.*

Animal Food.		Age.							
		—2 yrs.		—3 yrs.		—4 yrs.		—5 yrs.	
		No.	%	No.	%	No.	%	No.	%
Eggs	Nil . . . . .	162	100.0	175	94.1	160	90.0	185	86.0
	Less than twice a week.	0	0	10	5.4	13	7.4	24	11.3
	Twice a week or more often.	0	0	1	0.5	3	1.7	4	1.9
Fish	Nil . . . . .	87	54.0	54	29.2	17	9.5	13	6.1
	Less than twice a week.	50	31.1	91	50.8	125	69.8	124	57.0
	Twice a week or more often.	24	14.0	37	20.0	37	20.7	77	36.0
Meat	Nil . . . . .	157	98.1	177	95.7	155	88.1	184	86.4
	Less than twice a week.	3	1.9	8	4.3	19	10.8	28	13.1
	Twice a week or more often.	0	0	0	0	2	1.1	1	0.5

With such poor diet, it is no wonder that growth and development is slow and stunted. We have already made a reference to the low standards of height and weight of Singur children as compared with those of the Western countries, but a closer examination reveals highly unsatisfactory conditions. Two to six per cent of children varying according to age are rickety (*vide* Table CI), and quite a large percentage have delayed dentition. While normally 20 teeth should appear by the end of the 2nd year, only 38 per cent, 82 and 99 per cent of the Singur children between the ages of 2 to 3, 3 to 4 and 4 to 5 respectively had 20 or more teeth. Strangest of all was the delay in the closure of anterior fontanelle. The bones should normally join by the 14th month but as may be seen from table CII, 69 per cent of the children between 1 and 2 years, 42 per cent between 2 and 3 years, 12 per cent between 3 and 4 years and over 1 per cent between 4 and 5 years of age had patent anterior fontanelle.

TABLE CI.

*Distribution of Pre-School Children According to Age and Presence of Rickets.*

Rickets.	Age.				Total.
	—2 yrs.	—3 yrs.	—4 yrs.	—5 yrs.	
No. . . . .	153	175	173	210	711
Yes . . . . .	10	10	5	4	29
Percentage of rickety . . . . .	6.1	5.4	2.9	1.9	8.0

TABLE CII.

*Distribution of Pre-School Children According to Age and Condition of Anterior Fontanelle.*

Anterior Fontanelle.	Age.				Total.
	—2 yrs.	—3 yrs.	—4 yrs.	—5 yrs.	
Open . . . . .	112	77	22	3	214
Closed . . . . .	50	108	155	211	524
Percentage open	00.1	41.6	12.4	1.4	20.0

Functional development of our children is also greatly retarded (*vide* Table CIII). About one fourth of the children between 1 and 2 years are still crawling, 7.6 per cent of them between the age of 2 and 3 years still require support for walking, and 7 per cent 3 to 4 years old are unable to run about.

TABLE CIII.

*State of Functional Development on Pre-School Children.*

Functional development.	Age.							
	—2 yrs.		—3 yrs.		—4 yrs.		—5 yrs.	
	No.	%	No.	%	No.	%	No.	%
Crawling . . . . .	35	22.4	6	3.2	0	0	0	0
Walking with support . . . .	50	32.1	14	7.6	1	0.6	1	0.5
Walking without support . . .	57	36.5	00	48.6	11	6.3	1	0.5
Running . . . . .	14	9.0	75	40.5	102	93.1	188	98.9
Total . . . . .	156		185		174		190	

Normally a child should be able to speak in simple sentences by the end of the second year and should rapidly acquire coherent and intelligent speech thereafter. With many Singur children that is not the case (*vide* Table CIV). About 64 per cent of them between 1 and 2 years, 27 per cent between 2 and 3 years and nearly 3 per cent between 3 and 5 years are not able to speak.

TABLE CIV.

*Distribution of Pre-school Children According to Age and Ability to speak.*

	Age.				Total.
	-2 yrs.	-3 yrs.	-4 yrs.	-5 yrs.	
Speaking . . . . .	58	136	173	207	573
Not speaking . . . . .	104	50	5	7	166
Percentage not speaking . . . . .	64.2	27.0	2.8	3.3	22.5

We have made a reference to malnutrition as an important casual factor in the retarded growth and development of the children. There are undoubtedly other factors such as frequent illness to which reference will be made later. Racial factors, heredity, etc., may also contribute their shares but there can be little doubt that a great deal can be done towards bringing the infants and children nearer to passable standards if sicknesses amongst them can be prevented or reduced and their nutrition improved. Perhaps if there is one thing more than any other which will help their growth and development and give them a chance in life, it is the provision of good, clean, whole milk in sufficient quantities.

#### SCHOOL CHILD.

The first step in the progress of public health must necessarily be the dissemination of scientific knowledge about health and disease. We have already observed the state of knowledge with regard to the family as a whole. It has been suggested that school children are the most suitable section of the public to imbibe health knowledge and to carry out health practices because a deep impression of the essential scientific basis of health practice can be made and hygienic habits cultivated. In table CVI a summary of the results of interrogation of children attending schools is given.

It is also believed that the school child would act as an ambassador of health for the whole family. However, children attending schools constitute only 6 per cent of the population and about 21 per cent of the children of schoolgoing age. It will be observed that not more than 28 per cent of the school children possess elementary knowledge of infection as the cause of disease. The mean age of this group of children is 10 years. The poverty of knowledge in this respect is disappointing for a community living so near to and in such close contact with Calcutta. These remarks apply with added force to the state of knowledge of the schoolgoing children regarding the role of common insects like flies and mosquitoes in the transmission of disease. Knowledge regarding the faecal matter as a source of infection is also poor, 78 per cent of children being ignorant. Essential knowledge regarding the management of a well is possessed only by one quarter of the children and about 30 per cent of them understand the importance of milk for growth. It may be noted with regret that milk is not generally available for these children. In a recent survey carried out in certain villages in Singur Health Centre Area by Sen, Seal and Sankaran (1945) to which a reference has already been made, it was found that nearly 50 per cent of school children did not get any milk, 46 per cent received less than 10 ounces daily and only 4 per cent had more than 10 ounces of milk.

TABLE CV.

*The State of Knowledge of School Children in Health Matters and Sickness-absenteeism.*

Children.	Knowledge regarding specific health matters and Sick-Absenteeism.					
	Infection.	Insects.	Faeces disposal.	Water supply protection.	Food.	Exercise.
Percentage possessing specific knowledge.	28.0	18.4	22.4	25.6	30.4	34.1
Percentage of sick-absentees among those possessing the knowledge.	37.1	33.3	39.3	32.3	36.8	37.5
Percentage of sick-absentees among those who do not possess the knowledge.	42.2	42.5	41.2	43.7	42.5	42.5
Average period of sick-absenteeism in weeks, for those possessing the knowledge.	2.35	1.41	1.57	1.18	1.75	1.58
Average period of sick-absenteeism in weeks, for those not possessing the knowledge	2.22	2.45	2.46	2.63	2.48	2.61

In table CV an attempt has been made to correlate the possession of health knowledge with sickness experience (sickness absenteeism) and the duration of sickness. It will be observed that there is a consistent advantage for those who possess this elementary knowledge than those who do not. The difference is greatest amongst the group who know how to manage a well and the one that does not possess this knowledge. These differences are not significant, but the consistency of the data cannot be ignored. However, the reason for these differences may be other associated factors and not necessarily the possession of the specific knowledge.

*Health practices.*—Mere knowledge about elementary health matters would be of little avail if the children did not practice health habits. The position in this regard is more satisfactory except for posture and management of light during reading (*vide* Table CVI). About two thirds of the children are satisfactorily practising health habits as regards the regularity of food, regularity of evacuation, mouth hygiene and elimination of lice infection, but the proportion is reversed as regards cleanliness of nails and tidiness. Fifty-eight per cent of the children are in the habit of taking bath and attending to their personal cleanliness and 52 per cent habitually play outdoor games. Teeth are attended to by nearly 50 per cent of children and as many as 56 per cent of them keep and use handkerchief. There is remarkable difference between the percentages of sickness absenteeism (88.4) and between the average periods of sickness (4.7 weeks) to the advantage of those who keep and use handkerchiefs but it can be presumed that a child practising this detail of personal hygiene is also practising other health habits which help to keep it free from sickness. In these health practices the greatest difference as regards sickness absenteeism is to be seen amongst the group of children who take regular bath and those who do not. However it is not statistically significant. Next in magnitude, the advantage lies with the group of children practising mouth hygiene and those taking food regularly. Other items of health practices which exhibit appreciable differences are outdoor games, posture, reading light and tidiness. None of these are, however, statistically significant.

TABLE CVI.  
*Relation Between Health Practices and Sickness Absenteeism.*

CHILDREN.	Evacuation habits.		Mouth Hygiene.		Bath and Personal cleanliness.		Food regularly.		Outdoor play.		Posture and light during reading and writing.		Nails.		Tidiness.		Teeth cleanliness.		Louse Infestation.		Handkerchief and its use.	
	Satisfactory.	Unsatisfactory.	Satisfactory.	Unsatisfactory.	Satisfactory.	Unsatisfactory.	Satisfactory.	Unsatisfactory.	Satisfactory.	Unsatisfactory.	Satisfactory.	Unsatisfactory.	Satisfactory.	Unsatisfactory.	Satisfactory.	Unsatisfactory.	Satisfactory.	Unsatisfactory.	Satisfactory.	Unsatisfactory.	Satisfactory.	Unsatisfactory.
Percentage practicing.	85.6	34.4	68.8	31.2	57.0	42.4	62.4	37.6	52.3	47.7	14.0	85.1	36.8	63.2	30.4	69.6	40.8	50.7	60.3	30.7	56.3	43.7
Percentage of sickness absences.	43.1	40.3	30.5	46.2	30.6	48.4	37.6	48.2	37.8	45.8	35.7	42.5	40.6	42.2	45.6	36.8	30.2	40.8	39.8	44.3	3.8	90.2
Average period of sickness in weeks (including non-absences).	2.0	2.7	2.0	2.9	1.9	2.7	1.0	2.0	1.0	2.7	1.5	2.4	1.0	2.5	2.3	2.2	1.8	2.7	2.3	2.2	0.17	4.9

## CHAPTER VIII.

## NUTRITIONAL ASSESSMENT.

One of the most difficult problems facing the investigator is to determine the nutritional status of an individual without carrying out a series of elaborate biochemical tests which are beyond the realm of practicability in a survey like this, unless unmistakable signs of vitamin deficiency are present. Various indices have been designed to assess general nutrition but none of them have found universal acceptance. The best approach to the problem appears to be a systematic clinical examination as discussed in the introductory chapter under method. Here again, difficulties arise in ætiological discrimination for certain conditions *e.g.*, anæmia which may arise from a variety of causes including mal-nutrition. As will be seen below, we have not always been able to steer clear of these difficulties. We shall have something more to say on this subject when discussing iron deficiency. However, it may be claimed with fair justification that as regards the main proximate principles and vitamins a reasonable degree of accuracy has been attained so far as clinical evidence of any mal-nutrition is concerned, without any reference to the subclinical functional deficiency or the desirable or necessary reserve.

## Nutrition.

The overall nutritional state of the community as determined by general appearance is poor, less than 57 per cent being selected as normal,\* 37 per cent as slightly subnormal and nearly five and a half per cent as moderately so. A little less than half per cent were markedly ill-nourished, (*vide* Table CVII).

TABLE CVII.

*Extent of General Malnutrition.*

Grades of deficiency.	General.		Vitamin A		Vitamin B <sub>1</sub>		Vitamin B <sub>2</sub>		Vitamin D		Vitamin C		Iron.	
	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.
Normal . . . .	3587	56.8	4522	71.7	6244	98.9	5894	93.4	6251	99.0	5709	90.5	3860	61.2
Slightly deficient .	2359	37.4	1685	26.7	65	1.0	404	6.4	54	0.8	580	9.2	2427	38.6
Moderately deficient	341	5.4	102	1.6	2	0.03	12	0.2	4	0.1	22	0.3	24	0.4
Markedly deficient .	24	0.4	2	0.0	0	0	1	0.015	2	0.0	0	0	0	0
	6311		6311		6311		6311		6311		6311		6311	

Of the specific deficiencies slight lack of iron was most frequently met with. Only 61 per cent of population was classified as normal, 39 per cent slightly anæmic and 0.4 per cent moderately so. Some vitamin A deficiency was also noticed, a little less than 72 per cent of the people being found normal, 27 per cent slightly deficient and 1.6 per cent moderately deficient. In two instances marked deficiency was observed. Mention may also be made of deficiency in vitamin C. In this respect 90.5 per cent were found normal,

\*For the definition of various grades of nutritional deficiencies, please refer to the concluding remarks in the key of the Nutritional Assessment Card.

9·2 per cent slightly deficient and 0·3 per cent moderately deficient. The position regarding vitamin B<sub>2</sub> was also not quite satisfactory, as over 6 per cent of the population showed signs of slight deficiency, and 0·2 per cent of moderate deficiency. In respect of vitamins B<sub>1</sub> and D no deficiency of any consequence was discovered by ordinary physical examination.

### Sex distribution of deficiencies.

Tables CVIII and CIX set out information regarding the nutritional condition of the two sexes. Generally speaking the females are more poorly built than the males. There is but little difference in respect of specific deficiencies, except perhaps in respect of vitamin A, in which slight deficiencies are more frequent in the males than in the females and iron deficiency is more pronounced amongst the latter than amongst the former.

TABLE CVIII.

#### *Summary of Nutritional Assessment of the Male Population.*

Grades of deficiency.	General.		Vitamin A		Vitamin B <sub>1</sub>		Vitamin B <sub>2</sub>		Vitamin C		Vitamin D		Fe.	
	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.
Normal . . .	1926	59·3	2267	69·8	3211	98·9	3008	92·6	2946	90·7	3220	99·2	2054	63·8
Slight . . .	1171	36·1	919	28·3	35	1·1	231	7·1	291	9·0	24	0·7	1183	36·4
Moderate and marked	150	4·6	61	1·9	1	0·03	8	0·2	10	0·3	3	0·1	10	0·2

TABLE CIX.

#### *Summary of Nutritional Assessment of the Female Population.*

Grades of deficiency.	General.		Vitamin A		Vitamin B <sub>1</sub>		Vitamin B <sub>2</sub>		Vitamin C		Vitamin D		Fe.	
	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.
Normal . . .	1001	54·2	2255	73·6	3033	99·0	2886	94·2	2763	90·2	3031	98·9	1806	58·9
Slight . . .	1188	38·8	706	25·0	30	1·0	173	5·6	280	9·4	30	1·0	1244	40·6
Moderate & marked .	215	7·0	43	1·4	1	0·0	5	0·2	12	0·4	3	0·1	14	0·5

### Age distribution of deficiencies.

On the whole, nutritional condition in childhood is not quite satisfactory. Adolescence and early adult life is associated with the best nutritional condition. A fairly good nutritional condition is found up to the age of 35 years. Later in life there is more or less progressive decline in general nutrition, the most unsatisfactory state being observed in persons over 55. It is particularly distressing to note that some of the worst cases are observed in childhood, particularly between 5 and 10 years amongst whom 9 per cent are advanced cases (*vide* Table CX).



TABLE CX.  
Age Distribution According to General Nutrition.

Age Distribution According to General Nutrition.																										
Grade of deficiency.	- 5		-10		-15		-20		-25		-30		-35		-40		-45		-50		-55		55 +		Total.	
	No.	P.O.	No.	P.O.	No.	P.O.	No.	P.O.	No.	P.O.	No.	P.O.	No.	P.O.	No.	P.O.	No.	P.O.	No.	P.O.	No.	P.O.	No.	P.O.		
Normal	525	54.9	447	46.5	431	58.0	409	74.0	366	65.8	207	61.6	284	60.7	106	57.6	104	57.1	111	55.8	111	48.1	216	44.9	3587	
Slight	392	40.0	429	44.0	264	35.5	125	22.6	101	29.0	157	32.6	192	34.6	135	39.7	127	37.4	76	38.2	108	16.8	233	48.4	2350	
Moderate & marked	40	5.1	86	8.9	48	0.5	19	3.4	29	5.2	28	5.8	22	4.7	9	2.6	10	5.0	12	0.0	12	5.2	32	6.7	365	
TOTAL	956		962		743		553		556		482		468		340		340		109		231		481			
the best nutritional condition is																										

A similar variation in the vitamin A deficiency is also observed with age, but in this case the best nutritional condition is observed 10 years later, and it remains satisfactory for a longer period, *i.e.*, between the age of 15 years and 40 years. Except in old age the percentage of normal individuals is greater than in the case of nutrition. Advanced cases are more frequent in the extremes of age, particularly in the old age (*vide* Table CXI).

TABLE CXI.  
Age Distribution According to Vitamin A Deficiency.

Age Distribution According to Deficiency																									
Grade of deficiency.		-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	55 +	Total.											
Normal	{ No.	630	608	524	450	480	421	371	277	248	135	136	227	4522											
	{ P.O.	60.8	63.2	70.5	82.5	86.3	87.3	79.3	81.5	72.0	67.8	58.9	47.2												
Slight	{ No.	297	345	209	89	73	60	94	61	90	59	87	221	1085											
	{ P.C.	31.1	35.9	28.1	16.1	13.1	12.5	20.1	17.9	20.5	20.7	37.7	46.0												
Moderate	{ No.	20	0	10	8	3	1	3	2	2	5	8	31	102											
	{ P.O.	2.1	0.9	1.4	1.5	0.5	0.2	0.6	0.6	0.6	2.5	3.5	0.1												
Marked	{ No.	0	0	0	0	0	0	0	0	0	0	0	2	2											
	{ P.O.																								
TOTAL		956	962	743	553	550	482	468	340	340	100	231	481	6811											

Vitamin B<sub>1</sub> deficiency, as we have already seen, is not of particular importance. In fact such deficiency as may be found is practically limited to later years of life both in regard to proportion of persons affected and the degree of deficiency (*vide* Table CXII).

TABLE CXII.  
*Age Distribution According to Vitamin B<sub>1</sub> Deficiency.*

Grades of deficiency.	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	55+	Total.
Normal . . . { No. . . . . P.C. . . . .	950	957	730	548	552	474	468	339	338	195	228	461	6244
Slight . . . { No. . . . . P.C. . . . .	6	4	4	5	4	8	5	1	2	4	3	10	65
Moderate and marked. { No. . . . . P.C. . . . .	0	1	0	0	0	0	0	0	0	0	0	1	2
TOTAL . . .	956	962	743	553	556	482	468	340	310	199	231	481	6311

Vitamin B<sub>2</sub> deficiency is more commonly seen amongst children of school going age and after the age of 45 than in other age groups (*vide* Table CXIII).

TABLE CXIII.  
*Age Distribution According to Vitamin B<sub>2</sub> Deficiency.*

Grade of deficiency.	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	55+	Total.
Normal . . . { No. . . . . P.C. . . . .	916	883	677	527	538	461	436	324	309	183	211	429	5894
Slight and Moderate. { No. . . . . P.C. . . . .	40	79	66	26	18	21	32	16	31	10	20	51	416
Marked . . . { No. . . . . P.C. . . . .	4	8	8	4	3	4	6	4	9	8	3	1	1
TOTAL . . .	956	962	743	553	556	482	468	340	340	199	231	481	6311

In respect of vitamin C deficiency the adults are the worst sufferers. There is practically no deficiency amongst the children. In adolescence, a few individuals show slight signs of deficiency, and both in frequency and in degree of deficiency there is a progressive increase till the age of 45, after which there is a partial recovery and the old folk exhibit vitamin C deficiency relatively less frequently (*vide* Table CXIV).

TABLE CXIV.

*Vitamin C Deficiency According to Age.*

Grade of deficiency.	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	55+	Total.
Normal . . . {No. . . . .}	936	927	722	510	488	421	380	281	271	164	180	421	5709
{P.C. . . . .}	97.0	96.4	97.2	92.2	86.9	87.3	81.2	82.6	79.7	82.4	82.3	88.1	
Slight . . . {No. . . . .}	20	35	21	43	09	59	84	55	67	32	40	53	580
{P.C. . . . .}	2.1	3.6	2.8	7.8	12.4	12.2	17.9	16.2	19.7	16.1	17.3	11.4	
Moderate . . {No. . . . .}	0	0	0.0	0.0	4	2	4	4	2	3	1	2	22
{P.C. . . . .}	0.0	0.0	0.0	0.0	0.7	0.4	0.9	1.2	0.6	1.5	0.4	0.4	
Marked . . . {No. . . . .}	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL . . . .	956	902	743	553	556	482	408	340	340	190	231	481	6,311

Vitamin D deficiency is also of little importance in this area, but such, as it occurs, is practically limited to young children, though an occasional case may be observed in adult life (*vide* Table CXV).

TABLE CXV.

*Vitamin D Deficiency According to Age.*

Grades of deficiency.	-5	-10	-15	-20	-25	-	-35	-40	-45	-50	-55	55+	Total.
Normal . . . {No. . . . .}	937	952	741	550	550	1	402	388	336	198	230	478	6251
{P.C. . . . .}	98.0	99.0	99.7	99.5	99.5	99.9	98.7	99.4	98.8	99.5	99.6	99.4	
Slight . . . {No. . . . .}	16	10	2	3	6	3	5	2	3	1	1	2	54
{P.C. . . . .}	1.7	1.0	0.3	0.5	1.1	1.6	1.1	0.6	0.9	0.5	0.4	0.4	
Moderate . . {No. . . . .}	3	0	0	0	0	1	0	0	1	0	0	0	4
{P.C. . . . .}	0.3	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.3	0.0	0.0	0.0	
Marked . . . {No. . . . .}	0	0	0	0	0	0	1	0	0	0	0	1	2
{P.C. . . . .}	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2	
TOTAL . . . .	956	962	743	553	556	482	468	340	340	190	231	481	6311

Iron deficiency is not limited to any particular age group. However, a smaller proportion of children and adolescents suffer from iron deficiency than the adults, middle aged persons and the old people. The last exhibit iron deficiency more frequently and in greater degree than other groups. It is, however, somewhat surprising that relatively more advanced cases are found amongst children than amongst adults.

Separate analyses for deficiencies in males and females have been carried out and the expected numbers have been calculated for general nutrition, and vitamin A and iron deficiencies (see Appendix VI(B)). The results run more or less parallel. As regards general nutrition the deficiency commences at an earlier age amongst the females, though more advanced cases are seen with greater frequency amongst male children. Such differences in vitamin A deficiencies as exist between the two sexes are manifest at all age periods, except in the group 55 and above the women show disproportionately larger number of deficient but the deficiency is only slight. In regard to iron deficiency the females show more frequent cases of anæmia consistently in all age groups. Advanced cases are also to some extent more frequent amongst them.

### Seasonal changes.

In all ill-nourished community, depending as it does for its food supply mainly on local products the variation in the available food at different times of the year should be reflected in the nutritional status of the people. Tables have been constructed for deficiency in general nutrition and in certain factors (see Appendix VI(A-G)). They do not show consistent changes in the general nutritional condition between January and August in the haemoglobin content of the blood and in vitamin B<sub>1</sub>. The vitamin A deficiency appears to become somewhat less frequent in summer and early part of the rainy season. The chief source of this factor is the green leafy vegetables which are in abundance after December. Our data suggests that a period of 3 months or so is required for recovery of slight grades of vitamin A deficiency. But severe cases may continue to show signs of deficiency for a longer period. Unfortunately our data are incomplete, as the survey was discontinued in August. It would be interesting to see whether the scarcity of vegetable during the rainy season again depletes the vitamin A reserve and how quickly signs and symptoms reappear. Without undue emphasis on the higher frequency of the degree of vitamin A deficiency as noted during the last two weeks of the survey there is a suggestion of greater frequency of vitamin A deficient persons early in August. It would be interesting to make further investigation on the seasonal variation of vitamin A deficiency especially from August onwards.

It is interesting to note that though the differences are small the vitamin B<sub>2</sub>, vitamin C and vitamin D deficiencies are more marked during January and earlier part of February. The interpretation of recovery from vitamin C deficiency in the following months is understandable because of the availability of green vegetables early in spring. We refrain from commenting on the seasonal changes in the frequency of vitamin D and B<sub>2</sub> deficient persons because the explanation would be highly speculative. Here again complete data for the year would be desirable. It must be remembered that these observations for different periods have not been conducted on the same person nor in the

same local area. We have more or less moved from north western unions of Singur and Balarambati to the southern unions of Bora and Begumpur in the later part of the survey. Begumpur with its extensive cultivation of betel leaves is richer than other areas, and Bora is the poorest union. However, we believe that the seasonal changes that have been noted in regard to the vitamin A and perhaps vitamin C are partly due to seasonal factors apart from any local economic differences.

### General nutrition and occupation.

The ill-nourished belong chiefly to the groups "at home" and "at school". In other words, the worst sufferers are children, women and old people (*vide* Table CXVI).

TABLE CXVI.

#### General Nutrition According to Occupations.

Grades of deficiency.	Liberal profession.	Land Lord	At school	At home	Shop-keeper.	Artisan.	Cultivator.	Transport labour	Industrial labour	Other labourers	Total.
Normal . . No.	23	9	200	2131	86	27	780	8	81	273	3920
Expected . . "	23.9	3.2	210.4	2284.4	79.2	19.4	662.1	5.71	66.0	251.0	
Slight . . "	16	0	161	1392	51	6	354	2	39	146	2267
Expected . . "	15.6	3.4	143.4	1493.7	51.8	12.7	432.9	3.71	45.1	164.7	
Moderate & marked "	1	0	24	286	2	1	28	0	1	23	360
Expected . . "	2.4	0.3	22.2	231.0	8.0	2.0	66.9	0.6	7.0	25.5	
TOTAL .	42	9	385	4009	139	34	1162	10	121	142	6353

### General nutrition and wage earners.

The non-wage earners exhibit more general malnutrition than the wage earners both in frequency and in degree. In interpreting this statement one should remember that there is a greater incidence of mal nutrition amongst women, children and old people as already discussed, because it is from these groups that non-wage earners are almost wholly drawn (*vide* Table CXVII).

TABLE CXVII.

#### General Nutrition According to Wage Earners.

Grades of deficiency.	Yes.	Percentage for yes.	No	Percentage for No	Total.
Normal . . . . .	1264	65.2	2323	53.2	3587
Slight . . . . .	619	31.9	1740	39.8	2359
Moderate & marked . . . . .	57	2.9	308	7.1	365
TOTAL .	1940		4371		6311

## General nutrition and economic status.

Table CXVIII gives interesting data. Malnutrition occurs with greater frequency in the economic group II than in the economic group I, and with still greater frequency in economic group III. In the third group the normals and subnormals are very nearly equal. However, the differences in the three groups, both as regards the frequency of malnutrition and its degree are not very marked. In other words, while the relative prosperity enjoyed by group I gives it a certain advantage, it is comparatively small. Assuming that the poor physique is mainly an expression of nutritional deficiency, and there are reasons to support this assumption, the whole community suffers from lack of sufficient food even when the major part of the budget is devoted to it. Advancement in material prosperity which may raise the standard of living in matters other than fundamental bodily requirements will have to be of considerable magnitude, even though it may be admitted that other items than food would claim share of material prosperity before food requirements are fully satisfied. However, in this discussion we have to bear in mind the unusual conditions prevailing in Bengal at the time of investigation, although, as we have seen, this part of the country was not seriously involved.

TABLE CXVIII.

*General Nutrition According to the Main Economic Groups.*

Grades of deficiency.		Group I.	Group II.	Group III.
Normal . . . . .	No.	481	503	427
	P.C.	60.7	55.1	51.2
Slight . . . . .	No.	272	302	356
	P.C.	31.3	29.6	42.7
Moderate . . . . .	No.	40	41	48
	P.C.	5.0	4.8	5.8
Marked . . . . .	No.	0	4	3
	P.C.		0.	0.4
TOTAL .		793	913	831

## General nutrition and sickness.

In Table CXIX data regarding the degree of malnutrition according to the history of sickness during 1943 are given. As one would expect the frequency and degree of malnutrition is greater amongst those who have had sickness than amongst others, and there is greater malnutrition as the period of sickness is prolonged, the only exception being the group that has been sick for over 6 months. However, the difference is not significant. From this observation it would appear that the sub-normal physical appearance which has been taken as evidence of malnutrition is partly due to sickness during the proceeding year, particularly in cases in which it is more pronounced, but it is not wholly so because such a condition is not infrequently found amongst those who have had no sickness. This is a matter of considerable importance, because assuming that the sickness records are reliable as they

would appear to be so with regard to the duration of sickness, we have a means of estimating physical sub-normalities due to poor food as against those caused by diseases, and it would appear that not an inconsiderable amount of poor physique arises from deficiency of food in this community (*vide* Table CVII).

TABLE CXIX.

*General Nutrition According to Sickness Histories During 1943.*

Grades of deficiency.		Cholera.	Diarrhoea & dysentery.	Other fevers	Influenza and complications.	Malaria.	Measles.	Miscellaneous.	Pneumonias.	Typhoid and paratyphoid.
Normal	No.	13	105	50	20	766	113	78	25	23
	P.C.	39.1	43.4	59.5	31.3	47.3	43.6	46.2	65.8	56.1
Slight	No.	8	115	30	15	722	133	76	12	15
	P.C.	36.4	47.5	35.7	38.5	44.6	51.4	45.0	31.6	36.6
Moderate	No.	1	21	4	4	120	12	13	1	3
	P.C.	4.5	8.7	4.8	10.2	7.4	4.0	7.7	2.0	7.3
Marked	No.	0	1	0	0	10	1	2	0	0
	P.C.	0.0	0.4	0.0	0.0	0.6	0.4	1.2	0.0	0.0
TOTAL		22	242	84	39	1618	250	169	38	41

Sickness is an indefinite term so far as its effect on general physique is concerned. Table CXIX sets out relevant data for only chief causes of sickness. Even for these diseases the figures are small but some interesting points may be noted. It would appear that 'recovery' from some of the acute diseases like cholera, pneumonia, and typhoid and paratyphoid fevers may be more or less complete, whereas diseases like diarrhoea and dysentery, measles, malaria and other miscellaneous illnesses may cause considerable amount of physical deterioration which might delay 'recovery' to normal standard of physical fitness. These are crude observations and it is a question whether the so-called 'recovery' from sickness or even from unrecognised disorders is merely a compensatory state of health in which the reserves of the body are drawn upon to temporarily mask the damage to the extent that the patient's sense of well-being is not materially affected and whether this compensatory state of health in a large proportion of people does not constitute an important factor in the unstable state of public health in this country. To this may be added the observation which has been made in a later chapter, regarding the lesser sensibility of ill-health amongst a population accustomed to stress and strain of life.

#### General nutrition and spleen.

The remarks just made with regard to the share of sickness in causing poor physique may be reviewed in the light of table CXX, in which comparison is made of the physical state in persons with normal spleen and those with various degrees of spleen enlargement. As between the normal persons and those with enlarged spleens there is a considerable difference both in regard

to the frequency and the degree of poor physique. To this extent, therefore, chronic malaria infection, even though it may be sub-clinical, is responsible for a low physical state. However, the problem may be looked at in another way, *viz.*, that it may be poor nutrition which prevents or delays recovery from enlarged spleen. Whichever may be the primary cause, it would appear that a vicious cycle is set up which could probably be attacked most efficiently by a combined attack on both the malaria and the nutrition problems. The degree of spleen enlargement is generally associated with frequency of malnourished appearance, but it is not consistently so.

TABLE CXX.

*General Nutrition According to Spleen Enlargement.*

Grades of deficiency.		Not Palp- able.	Palp- able.	One finger.	Two fingers.	Three fingers.	4 or more fingers.	Total and spleen.		Per- cen- tages of spleen.	Non-palp- able.
Normal	No.	3170	137	63	107	45	27	3558	370	44.7	58.6
Expected	No.	3077.0	175.4	73.7	120.0	60.7	38.0				
	P.C.	58.6	44.3	40.2	48.2	37.2	40.3				
Slight	No.	1958	130	61	95	65	38	2346	388	45.8	30.1
Expected	No.	2020.0	115.7	47.0	83.1	45.3	25.1				
	P.C.	36.11	45.0	30.8	42.8	53.7	56.7				
Moderate and marked	No.	285	33	14	20	11	2	365	80	0.4	5.3
Expected	No.	315.7	18.0	7.5	12.0	7.3	1.0				
	P.C.	5.3	10.7	10.0	0.0	9.1	3.0				
TOTAL		5422	300	128	222	121	67	6200	647		

**General nutrition and blood parasites.**

The relationship between general physique and the presence of malaria parasite in blood has been analysed in two ways, *viz.* (1) according to the species of the parasite, and (2) according to their sexual and asexual forms. From table CXXI it will be observed that although the differences are small, persons in whose blood parasites were found were also physically poorer than the others. Contrasting these findings with those having spleen enlargement it may be observed that blood parasites are not always present in the peripheral blood, besides, of course, being missed when they are present in small numbers. While the spleen enlargement does not necessarily indicate the presence of live malaria parasite in the body, it is perhaps a better index of malaria infection than blood parasites. This is particularly so in connection with the present discussion, because we are not concerned here with the actual infection at the time of investigation, but with the effects of recent infection with malaria. The relative importance of the species of parasite in relation to general appearance is shown in table CXXI. The numbers are small and the differences are not marked. No significance can therefore be attached to this factor in the present study. From table CXXII it would appear that there is a slightly greater association between poor physical condition and the



presence of asexual form of the parasite than with the sexual forms, although the differences are small. This is possibly due to the fact that the actual toxic effects of the parasites are more operative in the asexual than in the sexual form, although against this one may consider the longer duration of infection when sexual forms are present.

TABLE CXXI.

*General Nutrition According to the Presence of Malaria Parasites of Various Species.*

Grades of deficiency		P. falciparum.	P. vivax.	P. malarise	Total.	Per cent.	Without parasite.	Per cent.
		Sexual, Asexual and both.	Sexual, Asexual and both.	Sexual, Asexual, and both.				
Normal	No.	50	18	11	88	54.0	2941	37.3
Expected	No.	58.8	19.4	9.7				
Slight	No.	13	16	5	64	39.3	1903	37.1
Expected	No.	12.8	14.1	7.1				
Moderate and Marked	No.	7	2	2	11	6.7	289	3.6
Expected	No.	7.1	2.4	1.2				
TOTAL		109	30	18	163		5133	

TABLE CXXII.

*General Nutrition According to the Presence of Sexual and Asexual Forms of Malaria Parasites.*

Grades of deficiency.		Sexual Mt., Dt. & Qt.	Asexual Mt., Dt. & Qt.	Both Mt., Dt. & Qt.	Total.
Normal	No.	20	53	15	88
Expected	No.	17.9	57.2	13.0	
Slight	No.	12	11	4	64
Expected	No.	13.0	11.0	9.4	
Moderate and marked	No.	1	9	1	11
Expected	No.	2.2	7.4	1.6	
TOTAL		33	106	24	163

#### General nutrition and haemoglobin.

From table CXXIII it is evident that in classifying individuals according to their physical appearance the haemoglobin content of the blood made its contribution. The problem that suggests itself from this observation is to ascertain the relative importance of nutrition as a cause of anaemia as compared with other causes of this condition.

TABLE CXXIII.

*General Nutrition According to Haemoglobin Content of Blood.*

Grades of deficiency.		Haemoglobin P.C.			Total.
		-50	-75	-100	
Normal	No.	30	2728	504	3271
Expected	No.	36.5	2736.8	473.4	
Slight	P.O.	60.7	56.6	60.4	
Expected	No.	54	1807	308	2169
Expected	P.C.	50.5	37.5	30.9	
Moderate and marked	No.	40.3	1811.8	313.9	
Expected	No.	14	280	22	322
Expected	P.O.	13.1	5.0	2.6	
Expected	P.C.	6.0	260.1	16.6	
TOTAL		107	4821	833	5702

## General nutrition and stool parasite.

That appearances are often deceptive is shown in table CXXIV, where the persons carrying hookworm are more frequently regarded as normal than those who are (subject to missed cases) free from the infection. The difference is significant. The explanation of why that is so, can only be speculative without further investigation.

TABLE CXXIV.  
*General Nutrition According to Stool Parasite.*

Grades of deficiency.	NIL.		Hookworm.	
	No.	P.C.	No.	P.C.
Normal . . . . .	604 (636.7)	52.2	555 (522.3)	58.4
Slight . . . . .	478 (449.9)	41.3	341 (69.1)	35.9
Moderate and marked . . . .	76 (71.1)	6.6	54 (58.6)	5.7
TOTAL . . . . .	1158		950	

*N.B.*—Figures in brackets are expected numbers.

## Vitamin A deficiency and social factors.

Vitamin A deficiency is almost entirely limited to children at school, although some advanced cases are seen amongst persons staying at home. Probably this is due to the inclusion of old people and school-age children in this group (*vide* Table CXXV). The distribution of vitamin A deficiency according to the economic groups is contrary to expectations (*vide* Table CXXVI). The poorest group shows significantly lower frequency of vitamin A deficiency than the economically highest groups. The middle group occupies an intermediate position. Natural foods containing vitamin A are usually expensive. How then these observations could be explained? It is possible that the chief source of vitamin A is green leafy vegetables. Fish is taken sparingly and mustard oil is devoid of vitamin A. Poorer people usually take larger quantities of food including perhaps the green leafy vegetables. Here is a problem for Public Health Administration to take up with fair prospects of success.

TABLE CXXV.

*Frequency Distribution of Vitamin A Deficiency According to Occupation.*

Grades of deficiency.		Liberal profes- sion.	Land- lord.	At school.	At home.	Shop- keeper	Arti- san.	Culti- vator.	Trans- port labour.	Indus- trial labour.	Other labours.	Total.
Normal . . . . .	No.	36	8	225	2858	106	21	838	5	103	353	4522
Expected . . . . .	No.	30.1	6.4	275.8	2872.6	99.6	24.4	832.6	7.2	86.7	316.7	
Slight . . . . .	No.	6	1	154	1079	38	13	306	3	16	85	1685
Expected . . . . .	No.	11.2	2.4	102.8	1070.4	37.4	9.1	310.2	2.7	32.3	118.1	
Moderate and marked . . . .	No.	0	0	0	72	0	0	18	2	2	4	104
Expected . . . . .	No.	0.7	0.1	6.3	66.1	2.2	0.5	19.2	0.16	2.0	7.3	
TOTAL . . . . .		42	9	385	4009	139	34	1162	10	121	442	6311

TABLE CXXVI.

*Frequency Distribution of Vitamin A Deficient Persons According to the Economic Status.*

Grades of deficiency.			I.	II.	III.	Total.
Normal . . . . .	No.		512	675	624	1811
	P.C.		61.6	73.0	74.8	71.3
Slight . . . . .	No.		268	223	196	687
	P.C.		33.8	21.4	23.5	27.0
Moderate . . . . .	No.		13	15	12	40
	P.C.		1.6	1.6	1.1	1.6
Marked . . . . .	No.		0	0	2	2
	P.C.		0.0	0.0	0.2	0.1
TOTAL . . . . .			793	913	834	2540

As between the wage earners and non-wage earners the former are significantly better off as regards vitamin A (*vide* Table CXXVII). This again may be due to the fact that the non-wage earners include the school age children and old people who suffer from vitamin A deficiency more frequently than others.

TABLE CXXVII.

*Vitamin A Deficiency According to the Position in the Family as Wage Earner.*

Grades of deficiency.			Yes.	No.	Total.
Normal . . . . .	No.		1448	3074	4522
	P.C.		74.6	70.3	
Slight . . . . .	No.		465	1220	1685
	P.C.		24.0	27.0	
Moderate and marked . . . . .	No.		27	77	104
	P.C.		1.4	1.3	
TOTAL . . . . .			1940	4371	6311

### Vitamin A deficiency and sickness.

Both the frequency and the degree of vitamin A deficiency is greater amongst the group who have had sickness during the year (1943) than amongst those that escaped, but there is no consistent relationship between the duration of sickness and frequency of vitamin A deficiency, except that prolonged sickness is frequently associated with vitamin A deficiency, and in some cases it is well advanced (*see* Table CXXVIII). It is interesting to note that of the chief diseases (*see* Table CXXIX) vitamin A deficiency was most frequently seen, and relatively larger number of advanced cases were seen amongst people who have had influenza with complications. Measles and dysenteries and diarrhoeas were the two other diseases in which large number of vitamin A deficiency cases were met.

TABLE CXXXVIII.  
Vitamin A Deficiency According to Duration of Sickness.

Grades of deficiency.		No. sickness.	Sick.	-1w.	-2w.	-3w.	-4w.	-5w.	-6w.	-8w.	-3m.	-4m.	-5m.	-6m.	9m +	Of & on.
Normal	No.	2071	1426	154	192	267	61	214	55	103	118	18	26	21	137	91
	P.C.	73.9	66.9	60.2	63.0	72.1	66.3	76.4	67.1	74.6	69.4	56.5	70.3	55.8	61.0	60.4
Slight	No.	897	638	96	100	72	27	63	25	31	51	34	10	18	75	14
	P.C.	22.0	30.0	37.5	35.7	25.1	29.3	22.5	30.5	24.6	30.0	10.0	27.0	41.9	34.4	32.1
Moderate and marked	No.	14	16	6	4	8	4	3	2	1	1	3	1	1	10	2
	P.C.	1.1	2.2	2.3	1.3	2.8	4.3	1.1	2.4	0.8	0.6	3.5	2.7	2.3	4.6	1.5
TOTAL		3912	2130	250	305	287	92	280	82	138	170	85	37	43	218	137

TABLE CXXXIX.  
Vitamin A Deficiency and History of Sickness From Various Diseases During 1943.

Grade of deficiency.	Cholera.	Dysentery & diarrhoea.	Other fevers.	Influenza with complications.	Malaria.	Measles.	Mucocutaneous.	Pneumonia.	Typhoid & Paratyphoid.
Normal	No.	15	56	14	1111	113	108	26	31
	P.C.	68.2	60.7	35.0	68.7	13.6	63.0	68.1	75.0
Slight	No.	7	21	22	477	110	53	10	8
	P.C.	31.8	28.0	50.4	20.5	54.1	31.4	26.3	10.5
Moderate	No.	0	4	3	30	6	8	2	2
	P.C.	6.0	4.8	7.7	1.9	2.3	1.7	5.3	4.9
Marked	No.	0	0	0	0	0	0	0	0
	P.C.	0	0	0	0	0	0	0	0
TOTAL	22	242	84	30	1618	260	169	38	41

It may be noted that the people who have had malaria did not show any greater frequency or more advanced vitamin deficiency than those who have had no sickness during the year. Both influenza and measles are virus diseases. In the case of diarrhoeas and dysenteries lack of absorption of carotene may be a matter of importance. These observations open up an important field of investigation and also suggest exhibition of vitamin A in these diseases. We have just stated that history of malaria during the previous year did not have much effect on the frequency or degree of vitamin A deficiency, but people carrying malaria parasites in their blood are more frequently deficient in vitamin A than those who do not. Even though the figures are small the carriers of *plasmodium malariae* more frequently exhibit vitamin A deficiency than do the carriers of the other two species of parasites (see Table CXXX).

TABLE CXXX.

*Vitamin A Deficiency According to the Species of Malaria Parasite.*

Grades of deficiency.		NIL.	Mt. Sexual, Asexual and both.	Bt. Sexual, Asexual and both.	Qt. Sexual, Asexual and both.	Total of Cols. 2-4.	Total of cols. 1-5.
Normal	No.	3664	72	23	6	101	3765
	P.C.	71.4	66.1	63.9	33.3	62.0	
Slight	No.	1400	31	13	10	57	1457
	P.C.	27.3	31.2	36.1	56.6	35.0	
Moderate	No.	68	3	0	2	5	73
	P.C.	1.3	2.8	0.0	11.1	3.1	
Marked	No.	1	0	0	0	0	1
	P.C.	0.02	0.0	0.0	0.0	0.0	
TOTAL		5193	109	36	18	163	5296

### Vitamin B<sub>2</sub> deficiency and sickness.

The only two diseases with which Vitamin B<sub>2</sub> deficiency is associated are 'other fevers' and 'pneumonias' (vide Table CXXXI). Diarrhoeas and dysenteries and typhoid fevers also show an appreciable number of vitamin B<sub>2</sub> deficiency. These observations may be useful for the guidance in treatment of these diseases.

TABLE CXXXI.

*Vitamin B<sub>2</sub> Deficiency According to Various Diseases.*

Grades of deficiency.		Cholera.	Dysentery and diarrhoea.	Other fevers.	Influenza with complications.	Malaria.	Measles.	Miscellaneous.	Pneumonias.	Typhoid and paratyphoid.
Normal	No.	21	222	72	37	1514	249	157	34	38
	P.C.	95.5	91.7	85.7	94.0	93.6	96.1	92.0	89.5	92.7
Slight	No.	1	10	12	2	102	10	11	4	3
	P.C.	4.5	7.9	14.3	5.1	6.3	3.9	6.5	10.5	7.3
Moderate and marked.	No.	0	1	0	0	2	0	1	0	0
	P.C.	0.0	0.4	0.0	0.0	0.1	0.0	0.6	0.0	0.0
TOTAL		22	242	84	39	1618	259	169	38	41



Although wage earners have apparently suffered less frequently from iron deficiency than the non-wage earners the difference is not significant (*vide* Table CXXXIV). Even, as regards the economic groups the differences in the frequency or the degree of iron deficiency are not marked or consistent (*see* Table CXXXV).

TABLE CXXXIV.

*Frequency Distribution of Various Grades of Iron Deficiency According to Position in the Family as Wage Earners.*

Grades of deficiency.	Yes.	Percentage.	No.	Percentage.	Total.
Normal . . . . .	1227	63.2	2633	60.2	3860
Slight . . . . .	709	36.5	1718	39.3	2427
Moderate and marked . . . . .	4	0.2	20	0.5	24
TOTAL . . . . .	1940		4371		6311

TABLE CXXXV.

*Frequency Distribution of Various Grades of Iron Deficiency According to Economic Status of the Family.*

Grades of deficiency.		1—5 Group I.	6—10 Group II.	11—15 Group III.	Total.
Normal . . . . .	No.	485	537	515	1537
	P.C.	61.2	58.8	61.8	
Slight . . . . .	No.	305	371	310	986
	P.C.	38.5	40.6	37.0	
Moderate . . . . .	No.	3	5	3	11
	P.C.	0.4	0.5	0.4	
Marked . . . . .	No.	0	0	0	0
TOTAL . . . . .		793	913	834	2540

### Iron deficiency and sickness.

In table CXXXVI the percentage of various grades of iron deficiency exclusively ascribable to malnutrition has been shown for persons who had suffered from certain diseases in the preceding year. Before entering into discussion of these data it is necessary to examine their significance. The

question of allocating iron deficiency to different causes of anaemia when multiple factors are operating is difficult. The procedure adopted, *viz.*, to exclude, as far as possible, such factors as can be demonstrated amongst the known causes of anaemia and to ascribe nutritional deficiency to the residue of cases obviously fail to bring out the full effect of malnutrition in respect of iron deficiency specially because it is reasonable to assume that, in many instances, malnutrition as well as some other factors are operative. Besides, when discussing the association of various diseases with iron deficiency caused by malnutrition one has to take into account the following five possibilities :—

1. There is a differential attack rate of various diseases in persons suffering from iron deficiency due to malnutrition.
2. Certain diseases, more than others, draw upon the iron reserve of the body.
3. Certain diseases, more than others, disturb the absorption and utilisation of iron though the intake is the same.
4. Certain diseases, more than others, affect the intake of iron.
5. The pathological processes involved in different diseases include either the destruction of red blood cells or physiological or even anatomical disturbance of the haemopoietic organs.

The contribution of the last factor must necessarily be excluded in assessing iron deficiency due to malnutrition. But with regard to the other four factors which either singly or in combination may be operative in addition to dietetic deficiency of iron cannot be separately assessed. In fact, there is a danger that the fifth factor mentioned above may be over emphasised and thus an underestimate for nutritional iron deficiency may result. The problem is very complicated and satisfactory interpretation of these data can hardly be expected. Perhaps the only way to determine the iron deficiency due to malnutrition would be to provide iron adequate for physiological need to the population without interfering with other causes of anaemia. Such improvement as might be effected may be ascribed to the nutritional factors. However, the question may still arise that certain diseases interfere with the proper absorption and utilisation of iron which could reasonably be blamed for anaemia instead of nutritional deficiency.

It will be observed that the percentages of various grades of iron vary greatly for different diseases. In certain groups of people such as those who had had measles or pneumonia, haemoglobin content of blood does not seem to have suffered, as compared with the general population. In other groups, like the ex-patients of typhoid, cholera, and diarrhoea there has been considerable malnutrition leading to iron deficiency, assuming, of course that these diseases by themselves did not contribute towards anaemia. There is another group of cases represented by ex-patients of malaria and other fevers in which percentage of nutritionally iron-deficients is significantly lower than in the general population. Since no one would suggest that a previous attack of malaria would increase the iron-content of the blood, and assuming that they had not been given a special course of iron treatment, the conclusion is obvious that persons who suffered from nutritional iron deficiency but also had malaria, have been excluded from the group. There is no way to estimate the number of such persons. It is not possible to determine the frequency of nutritional iron deficiency in these groups.



TABLE CXXXVI.

*Iron Deficiency and History of Sickness from Principal Diseases.*

Grades of deficiency.		Cholera.	Diarrhoea.	Other fever.	Influenza with complications.	Malaria.	Measles.	Miscellaneous.	Pneumonia.	Typhoid and paratyphoid.
Normal	No.	12	136	61	22	1226	158	85	23	19
	P.C.	54.6	56.2	72.6	50.1	75.8	61.0	50.3	60.5	46.3
Slight	No.	10	103	22	17	300	100	83	15	22
	P.C.	45.5	42.6	26.2	43.0	24.1	38.6	40.1	30.5	53.7
Moderate	No.	0	3	1	0	2	1	1	0	0
	P.C.	0.0	1.2	1.2	0.0	0.1	0.4	0.6	0.0	0.0
Marked	No.	0	0	0	0	0	0	0	0	0
[TOTAL]		22	242	84	39	1618	250	160	38	41

In view of the above remarks, it is not considered necessary to present the detailed analysis of nutritional iron deficiency for different species of malaria parasites and for the sexual and asexual forms. In fact, such analysis has been carried out but the results are of little interest.

*Iron deficiency and spleen enlargement.*

From table CXXXVII it will be seen that nutritional iron deficiency is less frequently seen amongst persons with enlarged spleen, than amongst people with normal spleen. This apparent paradox arises from the fact that in ascribing anaemias to iron deficiency other demonstrable causes of such deficiency have been excluded. Thus, these results would appear to arise from overcautionsness in relating anaemia to malnutrition.

TABLE CXXXVII.

*Frequency Distribution of Various Grades of Iron Deficiency According to Size of Spleen.*

Grades of deficiency.		Non-palpable.	Palpable.	One finger.	Two fingers.	Three fingers.	4 or more fingers.	Total.	No information.
Normal	No.	3096	265	117	188	103	58	3827	33
	P.C.	57.1	85.8	91.1	84.7	85.1	86.6		
Slight	No.	2307	42	11	32	18	8	2418	0
	P.C.	42.5	13.6	8.0	14.4	14.9	11.0		
Moderate	No.	10	2	0	2	0	1	24	0
	P.C.	0.4	0.6		0.9	0.0	1.5		
Marked	No.	0	0	0	0	0	0	0	0
TOTAL		5422	300	128	222	121	67		43

## Iron deficiency and 'haemoglobin.

Assuming that the iron deficiency due to nutritional causes has been correctly isolated from other causes it would appear that it is associated mostly with moderate degree of anaemias as is suggested by the table in which Talquist's readings are correlated with degrees of nutritional iron deficiency (*vide* Table CXXXVIII).

TABLE CXXXVIII.

*Frequency Distribution of Various Grades of Iron Deficiency According to Percentage of Haemoglobin.*

Grades of deficiency.		Percentage Haemoglobin.			
		—50	—75	—100	Total.
Normal . . . .	No.	66	2456	825	3347
	P.C.	61.7	50.0	98.0	58.1
Slight . . . .	No.	20	2303	0	2302
	P.C.	18.7	40.0	1.1	41.5
Moderate . . . .	No.	21	2	0	23
	P.C.	19.0	0.04	0.0	0.4
Marked . . . .	No.	0	0	0	0
TOTAL .		107	4921	831	5702

## CHAPTER IX.

## ARTIFICIAL IMMUNISATION.

Of the weapons which science has placed in the hands of Public Health administrator over diseases the most prized is vaccination against smallpox. It occupies a most prominent place in the Singur programme. Similar claims cannot be made for other immunisation measures. However, the reorganisation scheme had not become effective during the period of the survey.

## Artificial immunisation.

*Vaccination against small-pox.* The record of immunisation on the whole is satisfactory, the incidence of vaccination being 93 per cent. A perusal of table CXXXIX shows that all women above 25 years have had vaccination at least once in their life, and 99 to 100 per cent of men were also similarly protected. In fact, in our sample, barring 8 women all were protected from 10 years onwards. Of the males above 10, 28 were not protected. This higher incidence of vaccination among the female than the males in such communities is rather unusual. Children between 5 and 10 years were also fairly well protected, the incidence of vaccination being 96 per cent for either sex. The unsatisfactory condition of vaccination is to be found in children under 5 years of age. In this group only 56 per cent of the males and 57 per cent of the females were vaccinated. In other words, vaccination campaign has been well pushed in this area, but the protection is not fully given early enough.

TABLE CXXXIX.

*Distribution of Vaccination According to Age and Sex.*

Vaccination.	Age groups.	Age											Total.
		—	—1	—2	—3	—4	—5	—6	—7	—8	—9	—10	
Percent ever vaccinated.	Male	56	93	97	99	99	99	99	99	100	100	100	93
	Female	57	93	98	100	100	100	100	100	100	100	100	99
Percentage recently vaccinated.	Males	18.3	20.7	23.2	17.1	13.9	8.3	13.9	7.8	5.2	2.1	6.1	5.8
	Females	18.6	18.1	19.6	11.2	10.1	10.1	9.8	7.5	7.0	4.5	8.6	5.8

Recent vaccinations, i.e., within six months of the date of survey is highest amongst adolescents between 10 and 15 years, the percentages being 23.2 for the males and 19.6 for the females. Slightly lower percentages for both sexes were observed in younger children, being 20.7 for the male children between 5 and 10 and 18.1 for the females. Under 5 years the recent vaccinations were 18.3 and 18.6 for boys and girls respectively. Beyond 15 years there was a progressive decline in the percentage of recent vaccinations, the incidence being 17.1 for the males and 11.2 for the females 15 to 20 years old and 3.8 and 5.8 respectively for old people over 55. The group between 30 to 35 years is an exception for the males, the percentage vaccinated being 13.9; this higher rate is probably due to recent vaccination campaign in industrial concerns. It may be mentioned that only two deaths from small-pox occurred in the sample population during the year, but there were 8 cases of the disease giving a morbidity rate of 1.2 per mille. The incidence of small-pox mortality in the rural areas of British India as also rural Bengal in 1938 was 0.1 per mille.

While we have no reliable record for the incidence or morbidity in the country or in the Province as a whole, a rate of 1.2 per mille will not be considered low, against a mortality of 0.1 per mille. However, there was only one case under 5 years, the rest of the cases were distributed over all age groups. Strangely enough, all the adult smallpox cases were males, but amongst children under 15 years there were 3 females and 1 male. We have no comparative figure to offer but it is generally known that smallpox cases occur mostly amongst the Muslim population in this area. These data suggest that re-vaccination at frequent intervals should be carried out and primary vaccination should be insisted on at earlier age, if further reduction in the incidence is to be brought about.

### Immunisation against cholera.

Cholera immunisation is given considerable importance in the programme of anti-cholera campaign in this country. But it is actively carried out only when an epidemic is on or sometimes in connection with *melas* or other big public gatherings. At the time of survey 8.9 per cent of the males and 5.3 per cent of the females or 6.9 per cent of the sample population gave history of cholera inoculation, Recent inoculations (within 6 months) which really matter were not many. Only 0.7 per cent of the population was so protected. Recent inoculations amongst the males amounted to 0.96 per cent and amongst females to 0.36 per cent. It is not known how much of this represents pre-inoculation and how much inoculation during or after outbreaks in affected villages. From what has been previously mentioned it is likely that most of the recent inoculations were carried out when epidemic was on or it had began to decline, but in any case, whatever pre-immunisation is represented by these figures prophylactic inoculation of a small percentage of the population against possible outbreak of cholera cannot be of much value.

The females, as is the usual experience, have not received the benefit of cholera inoculations to the same extent as the males and even amongst the latter it is infrequent before 5 to 10 years of age (*vide* Table CXL). The policy regarding cholera inoculations must necessarily take into consideration many factors concerning herd-structures including the incidence of the disease, movements and the environmental conditions under which people live. It is questionable whether repeated mass inoculation will entirely suppress cholera while the living conditions remains as they are.

TABLE CXL.

*Cholera Immunisation by Age and Sex.*

Inoculations.	Sex.	Age.													All ages.
		—5	—10	—15	—20	—25	—30	—35	—40	—45	—50	—55	55+		
Percentage of inoculation.	Males .	2	7	10	12	8	14	12	6	12	22	6	7	8.9	
	Females .	1	5	5	6	0	7	4	5	5	8	7	5	5.3	
Percentage of recent inoculation.	Males .	0.4	1.0	1.8	1.7	0.4	1.7	2.0	0.0	0.5	0.0	0.0	0.0	0.96	
	Females .	0.2	0.4	0.3	0.4	0.3	0.8	0.0	1.8	0.0	0.0	0.0	0.0	0.36	

Male population—3332 ; female population—3060.

Immunisation against typhoid and para-typhoid is rarely practised.

## CHAPTER X.

## STATE OF HEALTH AND DISEASE.

! Morbidity statistics are difficult to compile for various reasons. Ordinarily, difficulty arises from the fact that all sick people do not come under observation of physicians, and all sickness is not reported to health authorities. The private practitioner is not expected to report all sicknesses even if he becomes aware of these and actually he does not do so even when and where the law requires. Besides, the records of sickness, such as may be available, are not only incomplete but are hardly ever obtainable in a form permitting compilation of morbidity statistics which can be properly interpreted. These difficulties are overcome by health surveys, and to that extent the discussion of morbidity and disabilities presented here is of considerable interest and significance, particularly because we are in a position to correlate sickness with a large number of single factors and with almost an unlimited number of combination of factors. Even when we avoid too many complexities arising from the simultaneous operation of a large number of factors, we are in a position to look at the morbidity statistics against the background of broad environmental and socio-economic features of the community, such as those briefly described in the preceding section in the present communication. However, this does not mean that all our difficulties are over; for, we have still to face certain theoretical and practical difficulties. In the first place, one may ask what is sickness or disease. The answer to this question partly depends upon the object in view. Important though the subject is, we do not propose to enter here into a lengthy technical discussion on the definition of disease, but most people would say that disease is a departure from health unfavourable to the subject. We do not know of a satisfactory definition of health, but we venture to suggest that health is a flexible state of body or mind which may be described in terms of a range within which a person may sway from the condition wherein he is at the peak of enjoyment of physical, mental and emotional experiences, having regard to environment, age, sex and other biological characteristics due to the operation of internal or external stimuli, and can regain that position without outside aid. According to this definition the positive health may vary within wide limits, and yet there may be no manifest sickness so long as the internal and external stimuli do not out-strip the limits beyond which unaided reversion to peak value of individuals capacity for enjoyment of physical, mental and emotional experience is possible. Thus the stability of the apparent state of health depends upon the relative values of the quantum of what we have called the 'fund of health' on the one hand and the force of internal or external stimuli which may tend to disturb the equilibrium, on the other hand. Some people like to think of health, with what justification we are not in a position to say, in terms of certain imaginary standard of health reserve which may be depleted up to a certain limit without causing symptoms of which the individual may be conscious. Here, the question of subjective sensitivity comes in. With varying degrees of depleted health reserve the individual is in a state of compensatory health. This condition though not clinically recognisable may be diagnosed by means of certain physical or chemical test in the course of health overhaul examinations. The term 'disorder' has been applied to this condition in contradistinction to 'disease'. *Whichever way we may look upon the problem, it is hard*

to draw a line between health and disease. Usually a certain amount of departure from the state of health is permitted within the scope of health. The difficulty arises from the fact that different individuals or communities may make allowances of varying degrees from such deviation. In rural India, where man is accustomed to various types of hardships the sensitivity to health is necessarily lower than where life is easier and health consciousness is more acute. We must keep this fact in mind when discussing the morbidity statistics.

Since we are mainly interested in the residential population of the area, the morbidity statistics discussed below relate to Group I only, unless otherwise stated.

Morbidity data are presented in two ways (i) sickness at the time of investigation and (ii) sickness during the previous 12 months. At the time of the survey there were 756 persons who, according to the local standard, did not enjoy good health amongst a sample of 6,551 present during investigation. Of these 1.1 per cent. were acutely ill, 2.1 per cent. were suffering from chronic illnesses and 8.4 percent were in indifferent state of health (*vide* Table CXLI).

It will also be noticed that acute and chronic sicknesses worry the males more than the females. The same feature is to be seen in sicknesses during the previous year.

TABLE CXLI.

*The State of Health of Individuals Examined According to Sexes and Residential Status.*

Residential Status.	Sex.	Well.		Acutely ill.		Chronically ill.		Indifferent Health.		Total.
		No.	P. C.	No.	P. C.	No.	P. C.	No.	P. C.	
Permanent residents present.	Male . .	2,017	87.8	48	1.4	85	2.6	272	8.2	3,322
	Female . .	2,733	89.1	22	0.7	47	1.5	264	8.6	3,006
	Both sexes .	5,050	88.4	70	1.1	132	2.1	538	8.4	6,388
All present including visitors and others.	Male . .	2,955	87.7	48	1.4	86	2.0	281	8.3	3,370
	Female . .	2,840	89.3	22	0.7	49	1.5	270	8.5	3,181
	Both sexes .	5,795	88.5	70	1.1	135	2.1	551	8.4	6,551

In the sample population present at the time of survey (Groups I, III and V) as many as 2,496 people gave history of sickness at one time or the other in the course of 12 months previous to the date of investigation. Of these 283 suffering from more than one disease; in other words, at the time of survey 11.6 per cent of the permanent residents present were unwell and 38.1 per cent of the population present at any time had suffered from one disease or the other during the year. The estimated population of the Singur Health Centre is 62,700 which would of course include persons belonging to the area usually residing outside, as also the visitors. According to the above rates it is estimated that at any particular moment there would be 690 persons acutely ill, 1,317 chronically ill and 5,267 in indifferent state of health or 7,274 persons would be unwell. The total number of persons who have suffered from one or the other disease during the year would be 23,889. Large as these figures are for a small area of 32.98 square miles they may be under estimates rather than over-estimates for the following reasons:—

(1) Low morbidity rate for the females.

- (2) Only serious sickness is likely to be remembered.
- (3) Health consciousness is low and
- (4) The survey was conducted mostly in non-malarial season.

If one aims at giving appropriate medical relief to every sick person these data will have to be carefully thought over before making plans to achieve that end.

We have already made a reference to this problem earlier in this chapter. If State medical relief was to be confined to acute and chronic illnesses the dispensary facilities will have to increase tenfold. It should however be remembered that the group of people complaining of indifferent health are potential contributors to chronic illnesses some of which may be serious. Sometimes vague symptoms may be early manifestations of fatal diseases, as for instance, cancer of the stomach. For this reason it would be undesirable to ignore such cases.

Obviously whether for purposes of medical relief or for purposes of designing preventive measures it is necessary to know the distribution of sickness by cause which will be discussed presently. The details are given in Appendix VII(a) and Tables CXLII and CXLIII (p. 143).

TABLE CXLII.

*Acute and Chronic Sickness at the time of Survey According to Causes.*

Disease.	Male.	Female.	Total.
Malaria . . . . .	49 (39.0)	28 (55.0)	75
Dysentery and diarrhoea . . . . .	19 (14.0)	8 (13.0)	27
Measles . . . . .	5 (8.6)	2 (3.4)	7
Asthma . . . . .	6 (3.1)	0 (2.8)	6
Other fevers . . . . .	2 (2.0)	3 (2.4)	5
Influenza . . . . .	3 (2.0)	1 (2.0)	4
Pneumonia . . . . .	3 (1.0)	0 (1.4)	3
Typhoid and para-typhoid . . . . .	2 (1.0)	0 (1.0)	2

NOTES.—Numbers in brackets refer to 'expected'.

The distribution of state of health according to age is given in Table CXLIV.

TABLE CXLIV.

*State of Health According to Age.*

State of health.	—5		—10		—20		—50		50—		Total.
	No.	Expected.	No.	Expected.	No.	Expected.	No.	Expected.	No.	Expected.	
Acutely ill . . . . .	21	10.5	12	10.7	13	14.0	15	25.8	9	8.0	70
Chronically ill . . . . .	20	19.8	15	29.2	30	26.8	40	50.6	21	15.1	132
Indifferent health . . . . .	83	80.5	82	83.1	80	100.8	158	205.8	133	81.3	586
Well . . . . .	835	848.2	870	885.9	1,160	1,125.0	2,223	2,164.3	567	646.7	5,660
TOTAL . . . . .	959	..	979	..	1,273	..	2,447	..	730	..	5,888

It will be noticed that chronic sicknesses and indifferent state of health are more frequent amongst the aged than may be expected from random

TABLE CXLIII.

*Principal Diseases during the year According to Age and Sex.*

Disease.	—5 yrs.		—10 yrs.		—20 yrs.		—50 yrs.		50 yrs. and over.		Total.		Grand Total.
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	
• malaria . . . . .	109 (122-0)	92 (120-4)	149 (128-0)	146 (124-6)	286 (193-7)	156 (135-7)	321 (321-1)	272 (312-3)	81 (94-8)	92 (94-5)	896	758	1,654
• measles . . . . .	70 (19-8)	52 (20-5)	51 (21-0)	46 (20-2)	22 (31-5)	15 (22-1)	5 (52-2)	8 (50-8)	0 (15-3)	0 (15-4)	148	121	269
Dysentery and diarrhoea.	31 (17-7)	34 (18-3)	19 (18-7)	9 (18-0)	15 (28-1)	7 (19-7)	41 (40-6)	27 (45-3)	19 (13-8)	33 (13-7)	125	115	240
Pneumonia . . . . .	4 (2-9)	2 (3-0)	3 (3-1)	2 (3-0)	3 (4-7)	2 (3-3)	15 (7-8)	2 (7-6)	4 (2-3)	3 (2-3)	20	11	40
• Typhoid and para-typoid	2 (3-0)	1 (3-1)	5 (3-2)	5 (3-1)	9 (4-8)	4 (3-4)	0 (8-0)	5 (7-7)	1 (2-3)	0 (2-3)	26	15	41
Cholera . . . . .	1 (1-5)	1 (1-0)	1 (1-0)	3 (1-6)	3 (2-5)	2 (1-7)	2 (1-1)	7 (4-0)	0 (1-2)	1 (1-2)	7	14	21

NOTE.—Numbers in brackets are expected numbers.



distribution. Amongst young children below 5 years and to a lesser extent amongst older children under 10 years acute sickness is relatively more frequent. Young children also show somewhat excess in respect of indifferent state of health. Adolescents and adults are in relatively better health than expected from their numbers except that chronic sickness was rather frequent amongst the adolescents.

In Table CXLV data regarding sickness according to age during the previous 12 months is summarised.

TABLE CXLV.

*Sickness during the previous 12 months According to Age.*

Age.	—5		—10		—20		—50		50—		Total.
Sickness.	No.	Expected.	No.	Expected.	No.	Expected.	No.	Expected.	No.	Expected.	
Sick	375	366	434	374	400	486	839	934	300	279	2,438
Not sick	584	593	515	605	783	787	1,608	1,513	430	451	3,950
TOTAL	959	..	949	..	1,273	..	2,447	..	730	..	6,388

Except for children between 5 and 10 years of age the experiences recorded in Tables CXLIV and CXLV are in agreement. There are two points to be taken into consideration: (i) The past history would probably not include indifferent state of health for which allowance has to be made. (ii) Why should there be a discrepancy between the high incidence of sickness during the year and the present state of health amongst children between 5 and 10 years of age? Looking into the causes of sickness during the past 12 months for this age group it appears that there was excessive diarrhoea and dysentery, measles and excessive malaria from the effects of which the children seem to have more or less recovered at the time of investigation. Since young persons recover from acute illnesses more quickly than others, the lower number of chronically ill in this group is understandable.

A reference to Table CXLIV will show that the males are subject to a greater rate of sickness than the females. The difference is particularly marked in acute illnesses and to a less extent in chronic ailments. The sickness rates during the year for the males and the females are 40 per cent and 36 per cent respectively. We shall refer to the point later.

#### Causes of Sickness.

The schedule furnishes information about the cause of sickness occurring during the previous 12 months. One can only expect that the subjects will remember sicknesses of serious nature which have laid them in bed, caused much pain or prevented them from carrying out their usual work or enjoyment. However, as we have seen there is a state of ill health described as indifferent which constitutes as much as 73 per cent of the total ill-health observed at the time of survey. This information is presumably lacking in the description of sickness during the year, unless indifferent state of health continues up to the time of survey. The cause of ill health at the time of survey is available from the Patient's Schedule or may be inferred from the diagnosis entered in the schedule in respect of the last sickness if it continued at the time of investigation.

From what has been stated above it should not be concluded that sickness during the year includes acute and chronic ailments or that part of ill-health designated as indifferent state of health for which definite diagnosis could be made, if these were observed during the investigation but had occurred only after the commencement of the survey. This explanation has been offered to show that it would be wrong to add the sickness recorded at the time of the survey to the history of sickness in the course of the year for obtaining total sickness in the sample. The details are given in Appendix VII(b) and in Tables CXLII and CXLIII.

The most important cause of sickness is malaria which claimed 75 victims at the time of investigation and 1,602 during the year or 37.1 per cent and 61.1 per cent of total sickness respectively. Next in importance, are diarrhoeas and dysenteries of which there were 27 cases at the time of investigation and 240 cases during the year which work out to 13.4 and 8.8 per cent of total sickness. Measles comes next in importance. Seven cases having been observed during the survey and 269 during the year or 3.5 per cent and 9.9 per cent of sickness respectively.

Of the other major causes mention may be made of fevers other than malaria, asthma, influenza, pneumonia, tuberculosis of the respiratory system, nephritis and diseases of the skin. Mumps, cholera, puerperal fever, scabies, leprosy, rheumatic fever and venereal diseases were of minor importance at the time of survey. One or two cases of smallpox, diabetes, kala-azar, ankylostomiasis, beri beri, cataract and certain other diseases were also present. One hundred and fifty-six sick persons out of which 148 were in indifferent state of health remained undiagnosed. For details of the rates and causes of sickness see Appendix VII (a) and (b).

#### Distribution of sickness by causes in different sections of the population.

In Table CXLVI is given the distribution of the principal causes of ill-health according to sex during the period of survey. The figures in the brackets indicate expected numbers. Generally speaking, the diseases are evenly distributed between the sexes, but slight excess of diarrhoea, asthma,

TABLE CXLVI.

*Principal Causes of Ill-health According to Sex at the time of Survey (Indifferent Health also included).*

Disease.	Male.	Female.	Total.
Diarrhoea and dysentery . . . . .	42 (38)	31 (35)	73
Other fever . . . . .	5 (9)	12 (8)	17
Influenza . . . . .	7 (5)	3 (5)	10
Malaria . . . . .	166 (170)	160 (156)	326
Measles . . . . .	15 (15)	14 (14)	29
Pneumonia . . . . .	6 (4)	2 (4)	8
Asthma . . . . .	11 (7)	3 (7)	14
Tuberculosis (resp.). . . . .	5 (4)	2 (3)	7
TOTAL . . . . .	257 (252)	227 (232)	484

NOTE.—The figures in brackets in this and subsequent tables are the expected numbers.

influenza and pneumonia may be observed amongst the males and of malaria and other fevers in the females. Similar information for sickness during the year is given in Table CXLVII.

TABLE CXLVII.

*Principal Diseases during the year According to Sex.*

Disease.	Male.	Female.	Total.
Chicken pox . . . . .	12 (8)	4 (8)	16
Cholera . . . . .	8 (11)	14 (11)	22
Dysentery and diarrhoea . . . . .	125 (121)	115 (110)	240
Other fevers . . . . .	37 (44)	48 (41)	85
Malaria . . . . .	902 (868)	757 (796)	1,659
Measles . . . . .	148 (140)	121 (120)	269
Miscellaneous . . . . .	96 (99)	76 (83)	172
Pneumonia . . . . .	29 (20)	9 (18)	38
Typhoid and para-typhoid . . . . .	26 (21)	15 (20)	41
Asthma . . . . .	14 (10)	5 (9)	19
TOTAL . . . . .	1,397 (1,332)	1,164 (1,229)	2,561

Here males are subject to greater incidence of malaria, measles, other fevers, pneumonia, typhoid and para-typhoid and asthma. Thus, on the whole, it may be said that respiratory and intestinal diseases have been prevalent amongst the males slightly in excess of the females. But with regard to malaria there is probably no sex difference, because while the cases amongst the males were more than expected when considering sickness during the year, it was otherwise at the time of investigation.

Distribution of the principal diseases by age and sex during the year is given in Table CXLVIII. It will be observed that cholera and enteric fevers reveal only minor differences between the actual and the expected figures, except perhaps for somewhat greater incidence amongst male adolescents. The same is more or less true for pneumonia, except that the adult woman has suffered somewhat less and the adult male somewhat more from this disease than might have been expected. Malaria definitely was more prevalent amongst older children, and adolescents of both sexes and relatively less prevalent amongst children below 5 years, and older people. Reverse was the case with dysentery and diarrhoea which mainly affected children of both sexes and the old people, particularly women. Measles, as one would expect, chiefly affected the young children under 5 years of age, particularly males and older children of either sex. However, some cases occurred amongst the adolescent and even amongst the adults of both sexes.

#### Morbidity and Certain Social Factors.

It is commonly stated that sickness is largely a matter of poverty and ignorance. To these we may add two other factors for consideration namely, addictions and occupation.

## Health and Education.

From Table CXLVIII it would appear that the just literate are the worst off in regard to acute and chronic illnesses and hardly better than others as regards minor ailments. Persons who have received secondary education are almost equally sickly. Numbers are small, but chronic illness is greater amongst the high school educated persons than amongst the illiterates. However, minor ailments are less frequent amongst them. At any rate, considering the illiterates on the one hand and the literates and better educated persons on the other, there is no significant difference in sickness of all kinds put together. There is no evidence to suggest that in the community under investigation the educated persons enjoy any advantage over the illiterates. However, the matter is rather complex because the two population are not comparable—firstly, the illiterates include infants and pre-school children which age groups are not represented in the literates. Secondly, there is much smaller number of females amongst the educated, thirdly the economic circumstances vary and lastly the sensibility to health differs in the two groups.

TABLE CXLVIII.

*Sickness at the time of Investigation amongst Permanent Residents According to Education.*

Education.	STATE OF HEALTH AT THE TIME OF SURVEY.									
	Well.		Acutely Ill.		Chronically.		Indifferent.		Total.	
	No.	P. C.	No.	P. C.	No.	P. C.	No.	P. C.	No.	P. C.
Illiterates . . . . .	4,562	89.5	64	1.0	98	1.0	438	8.5	5,152	..
Just literate . . . . .	667	87.1	12	1.6	21	3.1	63	8.2	766	..
Secondary . . . . .	226	88.3	3	1.2	5	2.0	22	8.0	256	..
High School . . . . .	177	90.8	1	0.5	5	2.8	12	6.2	195	..
University . . . . .	18	91.7	0	0.0	0	0.0	1	5.3	19	..
TOTAL . . . . .	5,650	..	70	..	132	..	536	..	6,388	..

As we have already seen the acute and chronic illnesses amongst the females are less common than amongst the males, this may, to a certain extent, explain the higher rate of acute and chronic diseases amongst the educated groups.

In Table CXLIX is set out the information regarding sickness during the year according to education. Here again the differences in educational status cannot be divorced from age and sex constitution and in most cases these factors seem to offer the necessary explanation.

The influence of addiction on health is complicated by the fact that sometimes habits are formed because of some illness and thus certain amount of bias is likely to come in. Besides, the children and also women largely belong to the group of non-addicts. In the present case, although acute illness and chronic illness are greater amongst the addicts of opium and alcohol than amongst the non-addicts, the numbers are too small to justify definite conclusion. Reference may be made to Table CL.

TABLE CXLIX.  
Principal Diseases during the year According to Education.

Education.	Population.	Cholera.	Diarrhoea and dysentery.	Other fevers.	Influenza.	Malaria.	Measles.	Miscellaneous.	Pneumonia.	Typhoid.	Asthma.
Illiterate	5,152	18 (17.7)	100 (103.6)	73 (86.6)	26 (30.6)	1,277 (1,337.2)	237 (217.0)	137 (137.1)	33 (30.6)	21 (33.1)	14 (15.3)
Literate	760	4 (2.6)	28 (29.8)	9 (10.2)	6 (4.6)	230 (108.8)	22 (33.3)	22 (20.4)	2 (1.0)	10 (4.0)	3 (3.3)
Secondary	256	0 (0.0)	3 (0.6)	0 (3.1)	2 (1.5)	79 (66.4)	7 (10.8)	4 (6.8)	2 (1.5)	5 (1.6)	1 (0.8)
High School	195	0 (0.7)	11 (7.3)	3 (2.6)	4 (1.2)	08 (50.6)	3 (8.2)	7 (5.2)	1 (1.2)	2 (1.3)	1 (0.6)
University	10	0 (0.1)	3 (0.7)	0 (0.3)	0 (0.1)	4 (1.0)	0 (0.8)	0 (0.5)	0 (0.1)	0 (0.1)	0 (0.1)
TOTAL	6,388	22	240	85	38	1,668	269	170	38	41	19

NOTE.—The numbers in brackets are expected numbers.

TABLE CL.  
Principal Diseases during the year According to Addition.

Additions.	Population.	Cholera.	Diarrhoea and dysentery.	Other fevers.	Influenza.	Malaria.	Measles.	Miscellaneous.	Pneumonia.	Typhoid.	Asthma.
NY	4,732	19 (17.0)	183 (187.4)	71 (83.7)	25 (28.0)	1,222 (1,260.8)	263 (199.3)	80 (134.8)	19 (32.6)	30 (30.4)	7 (16.3)
Smoking	1,507	3 (5.4)	40 (50.7)	14 (20.3)	12 (9.2)	301 (101.3)	4 (53.5)	63 (42.0)	19 (10.4)	10 (0.7)	11 (5.2)
Alcohol	70	0 (0.3)	4 (3.1)	1 (1.1)	0 (0.5)	18 (21.0)	0 (3.3)	0 (2.3)	2 (0.5)	1 (0.5)	1 (0.3)
Opium	56	0 (0.2)	7 (2.2)	0 (0.8)	1 (0.3)	9 (14.0)	0 (2.1)	7 (1.6)	0 (0.4)	0 (0.4)	3 (0.2)
Chorea	1	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Phlegm	6	0 (0.0)	0 (0.2)	0 (0.1)	0 (0.0)	3 (1.6)	0 (0.3)	0 (0.2)	1 (0.0)	0 (0.0)	0 (0.0)
Others	207	1 (0.7)	10 (8.2)	0 (2.8)	7 (1.2)	59 (35.2)	2 (8.7)	17 (5.0)	3 (1.4)	0 (1.3)	0 (0.7)
TOTAL	6,388	23	253	86	30	1,702	269	182	44	41	22

NOTE.—The numbers in brackets are expected numbers.  
The numbers in this column will not add up to total as there are some individuals who have more than one additions.  
Table CL has been given for general interest, but for the reasons stated above it is not intended to draw any conclusions.

TABLE CLI.

*Condition of Health in Relation to Addiction in the Sample Population.*

Addiction.	Well.		Acutely ill.		Chronically ill.		Indifferent health.		Total.
	No.	P. C.	No.	P. C.	No.	P. C.	No.	P. C.	
<i>Nil</i> . . . .	4,174	88.2	53	1.1	95	2.0	410	8.7	4,732
<i>Smoking</i> . . . .	1,337	88.7	16	1.1	34	2.3	120	8.0	1,507
<i>Alcohol</i> . . . .	68	86.1	3	3.6	8	3.8	5	6.8	79
<i>Opium</i> . . . .	50	89.3	0	0.0	2	3.6	4	7.1	56
<i>Chamra</i> . . . .	1	100	0	0.0	0	0.0	0	0.0	1
<i>Bhang</i> . . . .	6	100	0	0.0	0	0.0	0	0.0	6
<i>Others</i> . . . .	186	80.9	2	1.0	4	1.9	15	7.2	207

From the history of sickness during the year, distributed according to disease and occupation, it may be seen again that distributions are more or less even both for cholera and influenza. Dysentery and diarrhoea are relatively more common amongst those staying at home and amongst the shopkeepers and relatively less frequent amongst cultivators and other labourers. The same is also true for other fevers as regards the stay at home and the cultivators. Malaria is relatively in excess amongst school children, liberal professions, shopkeepers and labourers and relatively less prevalent amongst cultivators. Measles mainly affects the school children and those staying at home, and is infrequent amongst other groups. The cultivators and other labourers suffer slightly in excess from pneumonia than other groups. Typhoid affects particularly the school children and other labourers, and those staying at home suffered relatively less. Anti-typhoid inoculations may be encouraged in the schools with advantage. Other labourers also suffer frequently from asthma, but the disease is less often noticed amongst those staying at home (*vide* Table CLII).

Table CLIII sets out the state of health at the time of survey for various occupational groups in descending order of percentage of 'well' persons. Taking into considerations only the major groups it would appear that school children and cultivators contribute large number of acute cases while the chronic illnesses are common amongst school children, cultivators and those staying at home. Again, school children, industrial workers, shop-keepers and 'at home' complain of indifferent health more often than other groups.

TABLE CLII.  
Principal Diseases during the year According to Occupations.

Occupation.	No. in occupation.	Cholera.	Diarrhoea and dysentery.	Other fevers.	Influenza.	Malaria.	Measles.	Miscel- laneous.	Pneumonia.	Typhoid and para- typhoid.	Asthma.	All causes.
Liberal profession . . . . .	43	0 (0.1)	1 (1.6)	0 (0.6)	0 (0.3)	15 (11.3)	0 (1.8)	0 (1.2)	0 (0.3)	0 (0.3)	0 (0.1)	
Landlord. . . . .	8	0 (0.0)	1 (0.3)	0 (0.1)	0 (0.0)	0 (2.1)	0 (0.3)	0 (0.2)	0 (0.0)	0 (0.1)	0 (0.0)	
At School . . . . .	393	1 (1.4)	13 (14.0)	3 (5.2)	5 (2.3)	131 (102.0)	32 (16.5)	5 (10.0)	2 (2.3)	10 (2.5)	0 (1.2)	
At home . . . . .	4,024	15 (13.0)	195 (152.4)	64 (53.5)	21 (23.0)	1,002 (1,053.2)	225 (109.5)	01 (108.3)	14 (23.0)	18 (25.8)	8 (12.0)	
Shop-keeper . . . . .	137	0 (0.6)	10 (5.2)	3 (1.8)	2 (0.8)	45 (35.9)	1 (5.8)	2 (3.7)	0 (0.8)	0 (0.0)	0 (0.4)	
Artisan . . . . .	34	0 (0.1)	2 (1.3)	0 (0.5)	1 (0.2)	2 (8.3)	0 (1.4)	0 (0.0)	0 (0.2)	0 (0.2)	0 (0.1)	
Cultivator . . . . .	1,172	4 (4.0)	30 (44.4)	8 (15.0)	6 (7.0)	258 (300.4)	5 (49.1)	47 (31.0)	15 (7.0)	7 (7.5)	5 (3.3)	
Transport labour . . . . .	8	0 (0.0)	0 (0.3)	0 (0.1)	0 (0.0)	5 (2.1)	0 (0.3)	0 (0.2)	1 (0.0)	0 (0.1)	0 (0.0)	
Industrial labour . . . . .	124	1 (0.4)	5 (4.7)	2 (1.6)	1 (0.7)	45 (32.5)	8 (5.2)	3 (3.3)	1 (0.7)	0 (0.8)	1 (0.4)	
Other labour . . . . .	445	1 (1.5)	6 (16.0)	5 (5.0)	2 (2.0)	119 (110.5)	6 (18.7)	24 (12.0)	5 (2.0)	5 (2.0)	5 (1.3)	

NOTE.—Expected numbers are in brackets.

**TABLE CLIII.**  
*State of Health According to Occupation.*

Occupation.	Well.		Acutely Ill.		Chronically Ill.		Indifferent.		Total.
	No.	P.C.	No.	P.C.	No.	P.C.	No.	P.C.	
Transport . . .	8	100.0	0	0.0	0	0.0	0	0.0	8
Other labourers . .	414	98.0	1	0.2	7	1.6	23	5.2	445
Artisan . . .	31	91.2	1	2.9	2	5.9	0	0.0	34
Shopkeeper . . .	122	89.1	2	1.5	2	1.5	11	8.0	137
Industrial . . .	110	88.7	1	0.8	2	1.8	11	8.0	124
Cultivator . . .	1035	88.3	16	1.4	20	2.5	92	7.5	1,172
At Home . . .	3,546	86.1	41	1.0	80	2.0	357	8.0	4,024
Landlord . . .	7	87.5	0	0.0	0	0.0	1	12.5	8
At School . . .	240	86.5	7	1.8	10	2.5	36	9.2	593
Liberal Profession .	37	80.0	1	2.8	0	0.0	5	11.6	43

To what extent these differences are referable to economic conditions requires further investigation. However, the importance of school programme and of maternity and child welfare is definitely indicated.

**TABLE CLIV.**  
*Principal Diseases during the year According to Marital Status.*

Principal Diseases during the year

Marital Status.	Cholera.	Diarrhoea and dysentery.	Other fever.	Influenza.	Malaria.	Measles.	Miscellaneous.	Pneumonia.	Typhoid and para-typhoid.	Asthma.
Unmarried . . . 3,007	11 (10.7)	116 (110.4)	46 (41.2)	17 (18.4)	865 (808.8)	251 (130.4)	30 (82.4)	16 (18.4)	26 (10.0)	1 (0.2)
Married . . . 2	10 (9.0)	84 (98.2)	26 (34.8)	15 (15.5)	638 (678.5)	18 (110.1)	103 (60.6)	103 (15.6)	15 (16.8)	12 (7.8)
Widow . . . 471	1 (1.6)	34 (17.7)	13 (0.3)	6 (2.8)	128 (122.2)	0 (10.8)	22 (12.5)	2 (2.8)	0 (3.0)	4 (1.4)
Widower . . . 206	0 (0.7)	4 (7.7)	1 (2.7)	0 (1.2)	27 (53.5)	0 (8.7)	6 (5.5)	3 (1.2)	0 (1.3)	2 (0.0)
6,388	22	210	85	38	1,658	269	170	38	41	19

Table CLIV sets out data for the incidence of various diseases during the year according to marital status. It will be noticed that dysentery and diarrhoea is specially prevalent amongst widows, and the married people suffer relatively less often from these diseases. Widows as well as unmarried persons also suffer relatively more from other fevers while married people suffer less than expected. Influenza, influenzal pneumonia and cholera are no respecter of marital status being more or less evenly distributed amongst these groups. Unmarried persons are more frequently affected with malaria, while married persons and specially widowers suffer less. Excessive morbidity from measles as may be expected is almost restricted to the unmarried group, but this group also suffers from typhoid and para-typhoid fevers. Asthma, on the other hand, is mainly a disease of the married people and of the widows.



Reference to Table CLV will show that marital status is of considerable significance in the distribution of acute illness. Thus none of the widowers are acutely ill and the incidence of such illness is relatively small amongst the widows as compared with the other two groups. Here again the acute illness amongst the unmarrieds is twice as much as amongst the married people. On the other hand, the widowers suffer most from chronic sickness. This is inexplicable, but perhaps the differentiation amongst them, *i.e.*, between the chronic and acute illness has not been properly carried out. As regards indifferent health, the figure for widower is unbelievably high and none of the widows falls in the category. Taking total sickness into consideration, it is surprisingly high for the widowers, nearly half of whom were unwell. Equally surprising is the low incidence of sickness amongst the widows. As between the married and unmarried the former enjoy some small advantage over the other group. Here the age factor may be partly responsible for the difference noticed particularly in the case of the widowers who are mostly old people, and we are not in a position to assess the precise advantage that accrues in married life from these data. It is a matter of general experience that comparatively the married suffer less from diseases than the unmarried. This may arise both from the benefit of domestic care and from physiological advantage as regards non-specific resistance in married life as can be demonstrated in the case of animals.

While in urban areas economic differences are marked and are associated with widely different modes of living, the same cannot be said about rural areas. In the present study members of the upper class families have certain amount of advantage over the middle class, both in regard to acute and chronic illnesses, and the middle class again has relative advantage over the poorer section as regards such illnesses (*vide* Table CLVI).

TABLE CLV.

*State of Health According to Marital Status.*

Marital status	Well.		Acutely ill.		Chronically ill.		Indifferent.		Total.
	No.	P. C.	No.	P. C.	No.	P. C.	No.	P. C.	
Unmarried . . .	2,745	88.6	47	1.5	65	2.1	240	7.8	3,097
Married . . .	2,340	89.5	20	0.8	52	2.0	202	7.7	2,614
Widow . . .	459	97.5	3	0.6	9	1.9	0	0.0	471
Widower . . .	106	51.5	0	0.0	6	2.0	94	45.6	206

TABLE CLVI.

*State of Health According to Economic Status.*

Class.	Well.		Acutely ill.		Chronically ill.		Indifferent.		Total.
	No.	P. C.	No.	P. C.	No.	P. C.	No.	P. C.	
Upper . . .	705	83.1	9	1.1	15	1.9	71	8.9	800
Middle . . .	817	87.7	13	1.4	19	2.0	83	8.9	932
Lower . . .	714	83.3	15	1.9	22	2.7	58	7.2	809

It is unlikely that these differences are materially influenced by other than economic factor and we may for the time being accept that poverty is associated with a higher rate of sickness (acute and chronic), even in the villages. However, it is surprising that the poorer people exhibit relatively lesser incidence of indifferent health as compared with the better class families. Possibly it is a matter of health consciousness.

Table CLVII shows the distribution of sickness by causes for the wage earners and non-wage earners. The former have a certain advantage in regard to sickness from all causes and specially from dysentery and diarrhoea, other fevers and measles. The last named is easily explained. On the other hand, they have suffered relatively more from asthma and influenzal pneumonia.

While discussing the economic aspect of health, illnesses amongst wage earners are of interest. Taking into consideration only the permanent residents of the area which number 6,388, the wage earners are 1,994. Of these as many as 10.3 per cent. are unwell, 1.1 per cent. being acutely ill, 2.2 per cent. chronically ill, and 7.1 per cent. in indifferent health. Thus 3.3 per cent. of the wage earners are unable to work at any particular moment and over 7 per cent. cannot pull their full weight. At that rate 235,740 man-days are annually lost through acute and chronic sickness in the Singur Health Centre Area, not to speak of the inefficiency caused by minor ailments. It is, therefore, evident that ill health is an important cause of poverty.

TABLE CLVIII.  
*Sickness amongst Wage Earners and non-Wage Earners at the time of Investigation.*

State of health.	Wage Earners.		Non-Wage Earners.	
	No.	P. C.	No.	P. C.
Total number	1994	31.2	4304	68.8
Acute	21	1.1	40	1.1
Chronic	43	2.2	80	2.0
Indifferent health	142	7.1	304	9.0

Table CLIX in which the distribution of main diseases is given according to their position in the family brings out some interesting points.

TABLE CLVI.

Principal Diseases during the year According to Wage Earners.\*

	Population.	Chicken pox.	Cholera.	Diarrhoea and dysentery.	Other fevers.	Influenza.	Malaria.	Measles.	Miscel- laneous.	Pneumonia	Typhoid.	Asthma.	All causes.
Wage Earners	2,000	7 (4.6)	0 (0.7)	04 (75.7)	18 (27.8)	12 (12.0)	510 (520.1)	10 (83.7)	77 (53.4)	20 (12.0)	13 (12.9)	11 (6.8)	
Non-Wage Earners	4,542	8 (10.4)	19 (15.3)	183 (171.3)	71 (61.7)	27 (27.0)	1,189 (1,175.9)	268 (189.3)	97 (120.6)	19 (27.0)	29 (29.1)	8 (13.2)	
TOTAL	6,551	15	22	247	89	39	1,695	273	174	39	42	19	

\* In this table residential groups I, III and V have been included.

NOTE.—Figures in brackets are expected numbers.

TABLE CLIX.

*Sickness during the year according to Position in the Family (Primary or Secondary).*

Disease.	Primary.	Secondary.	Total.	Per cent. Primary.
Beri-beri . . . . .	1	0	1	100.0
Cataract . . . . .	4	0	4	100.0
Chicken pox . . . . .	11	5	16	68.8
Cholera . . . . .	14	7	21	66.7
Diabetes . . . . .	3	0	3	100.0
Diarrhoeas and dysentery . . . . .	190	51	241	78.8
Diphtheria . . . . .	1	0	1	100.0
Ear Disease . . . . .	5	0	5	100.0
Fevers, other . . . . .	65	20	85	76.5
Heart disease . . . . .	5	0	5	100.0
Influenza . . . . .	33	6	39	84.6
Kala-azar . . . . .	3	0	3	100.0
Leprosy . . . . .	4	2	6	66.6
Liver disease . . . . .	5	0	5	100.0
Malaria . . . . .	690	954	1,644	42.7
Measles . . . . .	127	142	269	47.2
Meningitis . . . . .	1	0	1	100.0
Miscellaneous . . . . .	159	12	171	93.0
Mumps . . . . .	3	1	4	75.0
Nephritis and others . . . . .	5	1	6	83.3
Nervous system . . . . .	3	1	4	75.0
Pneumonias . . . . .	37	2	39	94.9
Puerperal fevers . . . . .	0	1	7	85.7
Rheumatic fever . . . . .	11	1	12	91.7
Rickets . . . . .	1	0	1	100.7
Scabies . . . . .	7		8	87.5
Senility . . . . .	1	0	1	100.0
Skin diseases . . . . .	16	1	17	94.1
Smallpox . . . . .	6	2	8	75.0
Snake bite . . . . .	2	0	2	100.0
T. B. of respiratory system . . . . .	6	1	7	85.7
Typhoid and paratyphoid fevers . . . . .	31	10	41	75.6
Venereal diseases . . . . .	6	1	7	85.7
Asthma . . . . .	18	1	19	94.7
TOTAL . . . . .	1,480	1,223	2,703	..

Leaving aside asthma as a non-infectious disease it is strange to find that 94 per cent. of influenzal pneumonia cases and 93 per cent. of cases of other miscellaneous diseases as also the great majority of cases of dysenteries and diarrhoeas, influenza, V. D., typhoid and para-typhoid fevers, other fevers,

chickenpox and cholera should be primary. Actually the only diseases in which secondary cases slightly out-number the primary cases are measles and malaria. What may be the explanation of relatively low intra-family transmission of even diseases like influenza? What are the conditions which permit the infection of the disease to develop from outside sources? From the housing conditions, the level of environmental sanitation and the crowded way of living as described in chapter II, one might have expected more frequent development of secondary cases. The average size of the family is 5.9 individuals. Comparing the chances of acquiring clinical infection amongst the members of the family exposed to a primary case, and of any individual, other than the primary case, in the whole population (irrespective of whether there were cases in the village or not) the former are little more than twice the latter in case of dysentery and diarrhoea. It may be that on account of frequent traffic with Calcutta and suburbs, the primary cases have acquired infection outside the area from multiple sources. Is it because the strains of organisms are low in properties of diffusion, of tissue infection or of toxicity and have thus failed to produce clinical infection amongst the family members, or the people have acquired a high degree of resistance from frequent clinical or sub-clinical infection, or again the facilities for inter-family transmission are not materially less than those for intra-family transmission? In the absence of more exact knowledge as regards the sources of infection in each case, the properties of prevailing strains of the organism, the degree and distribution of specific resistance and the relative spread of non-clinical infection amongst the family contacts and others, it is not possible to fully answer these questions. But these results suggest that thorough and continuous investigation regarding the herd structure in respect of certain diseases may reveal interesting epidemiological patterns in respect of the various diseases constantly prevailing in the community. It is obvious that to devise measures intelligently and economically for interfering with the present distribution of infectious diseases the studies indicated above are both of practical and theoretical importance. It may also be stated that the picture presented here suggests that conditions are favourable for the development of epidemics, if for any reason the limiting conditions mentioned above fail to function.

#### Second sickness.

Of the 2,438 persons who reported sick during the year 278 persons or 11.4 per cent. suffered from a second sickness during the same period. The age distribution for various age groups is shown in Table CLX.

TABLE CLX.  
*Second Sickness during the year According to Age.*

	- 5	10	- 15	- 20	- 25	- 30	- 35	- 40	- 45	- 50	- 55	55—
Female & Male	76 (12.5)	44 (12.5)	75 (21.6)	9 (2.9)	13 (2.4)	11 (1.9)	16 (1.8)	11 (14.2)	14 (15.2)	6 (8.2)	9 (11.6)	32 (22.6)
Total persons	278	121	27	142	179	128	165	151	123	52	100	157

NOTE - Figures in brackets are the expected numbers

It is apparent that young children show relatively more frequent incidence of second sickness and so also the old people. Apart from the extremes of

life there is more or less an even distribution. In Table CLXI the sex distribution of the second sickness is shown, and here again the incidence is relatively greater in males than in females.

TABLE CLXI.  
*Second Sickness during the year According to Sex.*

	Males.	Females.
Second sickness . . . . .	165 (151·2)	113 (126·8)
First sickness . . . . .	1,326	1,112

NOTE.—Figures in brackets are the expected numbers.

### Second sickness and social factors.

*Education.*—As may be seen from Table CLXII the educated people have no advantage over the illiterate as regards the incidence of second sickness which shows that the type of education received or the health habits practised by the literates do not safeguard them against disease under the environmental conditions in which they live. It would therefore be interesting to see how the proposed school health programme brings about changes in this respect.

TABLE CLXII.  
*Second Sickness during the year According to Education.*

	Illiterate.	Literate.	Secondary.	High School.	University.
Second sickness . . . . .	218 (218·1)	40 (36·3)	11 (12·1)	9 (10·7)	0 (0·8)
First sickness . . . . .	1,913	318	106	94	7

NOTE.—Figures in brackets are the expected numbers.

*Marital status.*—The incidence of second sickness is less frequent amongst the married than amongst the unmarried persons. These differences are obviously due to age constitution, to a large extent. Widows are at a disadvantage to a certain extent (*vide* Table CLXIII).

TABLE CLXIII.  
*Second Sickness during the year According to Marital Status.*

	Unmarried.	Married.	Widow.	Widower.
Second sickness . . . . .	171 (145·6)	81 (105·2)	24 (21·9)	2 (5·4)
First sickness . . . . .	1,277	923	192	47

NOTE.—Figures in brackets are the expected numbers.

*Occupation.*—As may be seen from Table CLXIV the occupation makes little difference to the incidence of second sickness except in the case of 'at school' at home and 'other labourer'.

TABLE CLXIV.  
*Second Sickness According to Occupation.\**

	Liberal Profession.	Landlord.	At School.	At Home.	Shopkeeper.	Artisan.	Cultivator.	Transport labourer.	Industrial labourer.	Other labourer.
Second sickness .	0 (1.6)	0 (0.1)	27 (23.1)	179 (173.9)	6 (6.8)	1 (0.6)	46 (47.0)	1 (0.6)	7 (6.3)	12 (10.6)
First sickness .	16	1	203	1,523	60	6	412	5	55	172

NOTE.—Figures in brackets are the expected numbers.  
 \* Sickness of persons having more than one occupation has been shown under each of his occupations.

*Addiction.*—As regards addiction, the difference between the actual and expected numbers is small, but if anything, the advantage is with the addicts of tobacco smoking rather than with the non-addicts. The obvious explanation is the differences in the age constitution of the two groups. The number of alcoholics is small, but they seem to be at a certain amount of disadvantage as compared with others (*vide* Table CLXV).

TABLE CLXV.  
*Second Sickness According to Addiction.*

Sickness.	No addiction.	Smoking.	Alcohol.	Opium.	Charas.	Bhang.	Others.
Second sickness .	213 (203.4)	56 (65.4)	6 (3.2)	2 (3.0)	0 (0.1)	1 (0.8)	18 (10.5)
First sickness .	1,800	565	28	26	1	3	91

NOTE.—Figures in brackets are the expected numbers.

### Seasonal Incidence.

Seasonal incidence of sickness is given in Chart VII. It will be observed that April and May are the healthiest months and September and October the most unhealthy ones according to the present experience. The total sickness curve, particularly in the later half of the year is largely due to malaria, but in the first three months it is mostly constituted by other diseases of which fevers like measles and other droplet infection like influenza and influenzal pneumonia constitute the principal ones.

### Malaria.

Malaria, as we have seen, is the principal cause of morbidity and mortality in this part of the country. We have already described the environmental conditions favouring mosquito breeding and have discussed the mosquito fauna. The remarks made here about the incidence of enlarged spleen and of malaria parasites in circulating blood should be considered together with the factors discussed above

Distribution of Size of Spleen According to Age and Sex.

	Male.						Female.						Total.	
	—5	—10	—15	—20	—50	—55—	—5	—10.	—15	—20	—50	—55		55—
Non-palpable.	417 (417-1)	391 (427-3)	345 (380-9)	237 (255-7)	1,084 (1,058-5)	118 (112-1)	420 (427-3)	387 (412-8)	251 (266-0)	241 (232-7)	1,109 (1,048-2)	92 (90-0)	247 (225-1)	5,503
Palpable.	23 (23-0)	37 (21-5)	31 (22-4)	23 (14-7)	58 (60-7)	1 (0-4)	30 (21-5)	21 (23-7)	16 (15-2)	12 (13-3)	30 (60-1)	7 (5-2)	10 (12-9)	319.
One finger.	0. (10-4)	17 (10-7)	17 (9-7)	7 (6-4)	10 (26-4)	1 (2-8)	13 (10-7)	18 (10-3)	14. (6-0)	5 (5-2)	17 (26-2)	0 (2-2)	0 (5-0)	139
Two fingers.	25- (18-4)	35 (18-9)	33 (17-2)	17 (11-3)	37 (40-8)	4 (5-0)	23 (18-0)	25 (18-3)	13 (11-8)	8 (10-3)	19 (16-4)	1 (4-0)	0 (10-0)	246
Three fingers.	8- (10-2)	13 (10-4)	16 (9-5)	6 (6-3)	26 (25-9)	4- (2-7)	10 (10-4)	18 (10-1)	13 (6-3)	2 (5-2)	16 (25-6)	2 (3-2)	1 (5-3)	130
Four fingers.	2 (6-1)	7 (6-2)	15 (5-7)	10 (3-7)	14 (15-4)	1 (1-0)	2 (6-3)	11 (6-0)	4 (3-0)	2 (3-4)	11 (15-3)	0 (1-3)	2 (3-3)	81
No information.	7-	3	2	1.	8-	0	5	3	2	4	23	1	5	65
TOTAL	491	503	459	301	1,216	132	503	466	313	271	1,234	106	265	6,549

Note.—Figures in brackets refer to expected numbers.



## Spleen rate.

Spleen rate amongst children under 10 years of age was on an average 17.7 per cent. and amongst persons over 10 years it was 12.1 per cent. In Chart IX the spleen rates at quinquennial age groups are shown separately for males and females. It will be observed that the two curves run more or less parallel except near the termination, the female rates being as a rule lower than the male rates. In each case there is a double rise, one representing older children and the other early middle age. It is difficult to assign reasons for the bimodal distribution and for the differences observed in the males and females except that in the young adult, both the specific and non-specific resistance may be operative to a greater extent than at either extremes of life. The sex differences may partly arise from the difficulties in physical examination of females by male doctors, and partly because of the lower incidence of malaria amongst them.

It would appear that from early childhood to adolescence there is an increasing dispersion in the range of spleen size in both sexes (*see* Table CLXVI). In children under 5 years the 2 finger spleens are more frequent than may be expected. The average enlarged spleen for children under 10 years is 3.2 centimeter beyond the costal margin or 9.8 centimeter according to Christopher's method. Among persons over 10 years the average enlarged spleen is 3.4 centimetre. The average spleen for these two groups is 0.57 and 0.43 respectively.

We may further discuss the enlargement of spleen in a somewhat unconventional manner. Confining our attention to those who have had malaria during the year, the spleen rate of the 'well' people was 33.5 per cent., of the acutely ill 70.4 per cent., of the chronically ill 87.3 per cent. and of those in indifferent state of health 63.8 per cent. These figures indicate that malaria has a profound influence on the health of the people who had contracted the disease during the year, whatever may be the immediate cause of ill health at the time of investigation. To a certain extent it was so, even if those people were in apparent health at the time. Children who have had malaria but were 'well' during the survey spleen rate under 5 years of age was 43.7 per cent., under 10 years 40 per cent. and under 15 years 47.5 per cent. A spleen rate of 33.5 per cent. for the persons now in good health but who had had malaria during the year as against 14.2 per cent. for others shows that the effects of malaria frequently persist even when a person declares himself fit. A comparison has also been made of the various degrees of spleen enlargement for people suffering from cholera, dysentery and diarrhoea, other fevers, influenza, measles, influenzal pneumonia, typhoid and para-typhoid and asthma (*see* Table CLXVII) as against the expected numbers for those who have had no malaria and were well at the time of investigation. There was no noticeable difference in the actual and the expected numbers in cases of influenza, influenzal pneumonia and asthma, but persons suffering from measles, dysentery and diarrhoea and to a certain extent from 'other fevers' and typhoid and para-typhoid showed somewhat greater enlargement than expected. These persons did not give any history of malaria during the year. Is it possible that some of these diseases have to a small degree contributed towards the enlargement of the spleen or they had suffered from malaria but had forgotten? We consider that the former possibility should not be ruled out.

TABLE CLXVII.

*Spleen-Enlargement amongst Persons without History of Malaria who suffered from certain Diseases during the year.*

	Cholera.	Diarrhoea and Dysentery.	Other fevers.	Influenza.	Measles.	Influenzal pneumonia.	Typhoid and Para-typhoid	Asthma.	Malaria	Well.
Non-palpable . . .	17 (18.4)	143 (158.5)	65 (72.5)	25 (20.0)	105 (187.4)	32 (31.9)	34 (37.7)	17 (18.4)	945 (1,588.2)	3,627 ..
Palpable . . .	0 (0.2)	5 (2.1)	5 (1.0)	4 (0.4)	12 (2.5)	0 (0.4)	2 (0.5)	0 (0.2)	228 (20.4)	48 ..
1 Finger . . .	1 (0.1)	3 (0.7)	3 (0.3)	1 (0.1)	4 (0.9)	0 (0.1)	0 (0.2)	1 (0.1)	95 (7.2)	17 ..
2 Fingers . . .	1 (0.2)	4 (1.5)	0 (0.7)	0 (0.3)	8 (1.8)	1 (0.3)	3 (0.4)	1 (0.2)	172 (14.8)	86 ..
3 Fingers . . .	0 (0.1)	5 (0.7)	1 (0.3)	0 (0.1)	2 (0.9)	0 (0.1)	0 (0.2)	0 (0.1)	99 (7.2)	17 ..
4 Fingers . . .	0 (0.1)	4 (0.5)	1 (0.2)	0 (0.1)	3 (0.6)	0 (0.1)	0 (0.1)	0 (0.1)	53 (4.7)	11 ..
TOTAL . . .	19	164	75	30	194	33	39	19	1,592	3,765

NOTE.—Figures in brackets are expected numbers.

### Blood parasites.

No blood parasite except malaria parasite was found in any person. Thick and thin blood films of 5,436 persons were examined. One hundred and eighty-four persons carried this parasite (3.4 per cent.). The parasite rate amongst children under 10 years was 5.3 per cent. and that amongst persons over 10 years it was 2.6 per cent. The gametocyte rates in the two groups were 40.0 and 37.2 per cent. respectively. The distribution of the various species of parasites is shown in Table CLXVIII.

TABLE CLXVIII.

*Incidence of Different Species of Malaria Parasites in the Sample Population.*

MALIGNANT TERTIAN.			BENIGN TERTIAN.			QUARTAN.		
Asexual.	Sexual.	Both.	Asexual.	Sexual.	Both.	Asexual.	Sexual.	Both.
73	36	15	33	3	6	7	1	10

M.T.=2.3 p. c.

B.T.=0.8 p. c.

Quartan=0.3 p. c.

The percentages of the males and the females carrying parasites at different age groups are shown in Chart VIII.

### Haemoglobin.

Five thousand nine hundred and forty-two persons were examined for haemoglobin content of the blood.

TABLE CLXIX.

*Distribution of Persons who had had certain Illnesses during the year according to varying percentages of Haemoglobin.*

Haemoglobin percentage.	Well.	Cholera.	Diarrhoea and Dysentery.	Other fevers.	Influenza.	Measles.	Influenzal pneumonia.	Typhoid and Para-typhoid.	Asthma.	Malaria.
—50	27	1 (0.2)	4 (1.1)	1 (0.5)	0 (0.2)	2 (1.4)	1 (0.2)	12 (6.3)	3 (0.1)	50 (11.9)
—75	2,600	15 (15.6)	128 (110.0)	53 (50.7)	21 (23.0)	145 (148.6)	54 (23.8)	20 (28.7)	15 (14.8)	1,312 (1,233.4)
—100	584	3 (3.3)	13 (24.8)	15 (11.8)	7 (4.8)	34 (31.0)	4 (5.0)	4 (6.0)	0 (3.1)	140 (257.1)
TOTAL	3,411	19	145	69	28	181	20	35	18	1,502

NOTE.—Figures in brackets are expected numbers derived from data for 'well' persons who have had no sickness during the year.

Haemoglobin deficiency is more marked amongst the females than amongst the males, thus while amongst the former —50 per cent., —75 per cent., and under 100 per cent. deficiencies are present in 1.6 per cent., 81.3 per cent. and 17.1 per cent. respectively, the corresponding figures for the females are 2.0 per cent., 85.8 per cent. and 12.2 per cent.

Taking midpoints of the intervals on the Talquists scale, the average haemoglobin percentage for each sex and various age groups were calculated and the deficiencies from maximum were worked out. These are shown in Chart X. It will be observed that starting with 35 per cent. deficiency in both sexes, in the age group under 5 years, there is little change in the male population till adolescence when a sharp improvement takes place and the haemoglobin deficiency is reduced to under 30 per cent. Early in adult life there is a slight deterioration which continues progressively till the old age, when the same level as in the beginning is reached. The picture is materially different for the females. They continue at the same level as they begin till the age of 25 when there is a sudden deterioration touching 38 per cent. deficiency. There is a partial recovery at 35 years of age after which, slight improvement continues till old age when the female curve again meets the male curve. It may be noted that, the period of greatest deficiency in haemoglobin content of the blood amongst the females corresponds to the period of greatest reproductive activity (see page 102). It may also be seen (*vide* Chart XI) that the relative frequency of hookworm infestation in the two sexes, at the various age periods, does not explain the sex differences in haemoglobin deficiency. While we cannot exclude hookworm infestation as a contributory cause for anaemia in this community, there are, evidently a complex group of causes operating to bring about the unsatisfactory blood picture. Nutritional deficiencies and malaria and possibly other diseases are some of the casual factors which await investigation. There is a strong suggestion that

pregnancy amongst the females is also associated with low haemoglobin. More light may be thrown on the problem by further analysis, though the figures are small. A comparison of the haemoglobin percentages of persons suffering from certain diseases as compared with the expected numbers derived from 'well' persons who have had no illnesses during the year are set out in Table CLXIX. It will be seen that persons with lower haemoglobin percentage are more frequently met with under malaria, asthma, diarrhoea and dysentery and to a certain extent under cholera and perhaps under influenzal pneumonia. In other diseases like measles and typhoid and in 'other fevers' like influenza either no difference from the expected numbers is noticeable or there is a slight difference in the reverse direction. Thus this analysis would suggest that the chief causes of anaemia amongst those for whom information is available are malaria, asthma and dysentery and diarrhoea.

### Stool parasites.

Stools of 2,195 individuals were examined, 2,134 of whom belonged to Group 1, 5 to Group III and 56 to Group II. Considering only the permanent residents of the Area stools were examined of 1,135 men and 999 women. In both sexes together the carrier rate of hookworm ova was 43.9 per cent. slightly more amongst the males (46.4 per cent.). *Ascaris* infection was present in 3.7 per cent. of population — 3.1 per cent. amongst the males and 4.4 per cent. amongst the females. The difference is not significant. Other stool parasites were found in 1.2 per cent. of the population.

The carrier rates of hookworm ova for the two sexes at different age groups are shown separately in Chart XI. It would be observed that the rates for the two sexes run more or less parallel. There is gradual accumulation of the worms as the age advances up to the middle age and then there is a slight decrease in the infestation rates amongst the old people. These findings are based on rough method of stool examination. Investigations involving the use of more exact methods and estimation of the number of eggs per c.c. of faeces are indicated. Improvement in the disposal of night soil accompanied by mass treatment will probably lower the incidence of the state of indifferent health, improve the blood picture and increase the working efficiency of the people.

## CHAPTER XI.

*State of Health and Disease.***Morbidity in Special Groups of Population.**

We have already discussed the distribution of sickness by causes for various age groups. Considering the main age groups, viz., the infants, pre-school children, school children and adults the distribution of sickness from all causes is given in Table CLXX.

TABLE CLXX.

*Distribution of Sickness during the year according to Special Age Groups.*

	Infants.	Pre-School children.	School children.	Adults.	Total.
No. of sick not including deaths	118	327	741	1,323	2,509
Percentage of population sick but survived.	52.7	45.9	43.1	35.7	39.4
No. of sick including deaths	160	359	751	1,406	2,676
Percentage of population sick including fatal cases.	71.4	50.4	43.7	37.9	42.0
No. of sick persons per death	4	11	75	17	10.0

It may be mentioned here that sickness history for infants (possibly for pre-school children) was not fully elicited while filling the General Individual Schedule but fortunately this deficiency could be made up because the information was repeated in the Addendum for infants and pre-school children. Thus while the history of sickness was obtained in the General Individual Schedule for 48 infants only, from the Addendum history of sickness was elicited in 118 instances. In the case of pre-school children the information contained in the Addendum corresponds fairly closely with the data obtained from the General Individual Schedule. It is clearly seen that percentage of population that suffered from various illnesses decreases with age, whether we include the fatal cases or not. Just about 40 per cent. of the total population suffered from some disease or the other and survived and including the fatal cases the percentage was over 42. Sickness amongst infants involved over 71 per cent. of infant population, 50 per cent. of the pre-school children, 43 per cent. of the school children and 38 per cent. of the adult population. These are impressive figures which have to be borne in mind by the Public Health Administrator. Leaving for the moment the school age population from consideration, it will be observed that the number of sick per death is the lowest amongst the infants and it increases as the age advances or to put it differently the case fatality rate (all diseases) decreases with age. This is a well established epidemiological phenomena and the data presented here clearly indicate how necessary it is to try and reduce sickness in early age. This will not only reduce the high mortality in tender age groups but will also lower the total death rate. Here again the data presented should be of special interest to the Public Health Administrator as regards relative emphasis on various sections of the health programme. As regards the exceptionally low case mortality noticed here for school going population it should be remembered that only 10 deaths amongst this group were recorded. The school

age population amongst the sample is only 1,720, and the death rate on the basis of the recorded mortality is  $5.8 \pm 1.7$  *per mille*. It is possible that amongst this group 3 deaths have been missed. In any case there can be no doubt that fewer deaths compared to the sickness occur at school age than at other periods of life.

*Infants.*—It is generally believed that socio-economics, as well as the environmental factors have a great bearing on infant mortality rate, and indeed this rate has been generally accepted as an index of the conditions named above. A comparison of the morbidity rates amongst infants for different economic status at various age periods has been made (*see Table CLXXI*). Strangely enough, group I or the uppermost economic group in almost all age periods shows the highest morbidity rate (the only exception being age group 3 to 6 months). For the economic groups I and II the morbidity rates are irregular. How to explain these strange results? These figures relate to the survivals; the illnesses of fatal cases have been ignored which in early life may contribute a considerable proportion of total sickness. *Is it possible that a much higher rate of mortality amongst poorer infants has brought about these results or these findings are spurious because the folks of lower economic levels give less accurate information than their more prosperous brothers?* Unless these snags have been removed it would be hard to believe that prosperity, even in the limited sense in which it prevails in this community, is, in any way, related to greater incidence of sickness.

TABLE CLXXI.

*Incidence of Sickness during the year in Infants According to Age and Prosperity Levels.*

Age.	Economic Group.	Number exposed.	Number sick.	Percentage.
1 month . . . . .	I	30	7	23.3
	II	40	3	6.1
	III	23	2	6.1
1-3 months . . . . .	I	29	6	20.7
	II	43	3	7.0
	III	20	1	3.4
3-6 months . . . . .	I	24	4	16.7
	II	36	3	8.3
	III	15	4	26.7
6-9 months . . . . .	I	11	8	72.7
	II	22	7	31.8
	III	7	3	42.9
9-12 months . . . . .	I	6	5	83.3
	II	7	4	57.1
	III	1	0	0

More detailed causes of sickness amongst 118 infants are given in Table CLXXII. It will appear from the statement that dysentery and diarrhoea, measles, malaria and bronchitis constitute the principle causes of sickness. The above table may also be of interest to those concerned with neonatal

morbidity. It will be observed that excluding fatal cases sickness rate is high immediately after birth and decreases during one to three months and then rises again steadily till the end of the first year.

It is generally believed that weaning is considerably delayed in this country. Our data are small (see Table CLXXIII) but they seem to suggest that under the conditions existing in the community there is a considerable amount of advantage for those whose diet is restricted to mother's milk. There is a possible fallacy in this argument because it may be that the unweaned infants being younger have had shorter period of exposure and shorter span of life in which to become sick. The only way to make proper assessment would be to base the experience of sickness on person days lived. This analysis being of a rather elaborate nature has not been carried out at present. However, it cannot be said that the biological advantage is with the unweaned group. The above criticism has been largely removed in Table CLXXIV where the percentage of sick (including fatal cases) has been reduced to monthly basis at different age groups. The advantage enjoyed by infants from 1 to 6 months (when they would be breast fed) over older infants is clearly shown. This is perhaps understandable when one thinks of chances of infection conveyed through cow's milk or other food. Acquired passive immunity from mother's milk, etc., is an additional factor.

TABLE CLXXII.

*Distribution of Sickness by Causes amongst Infants of Various Age Groups.*

Diseases.	Under					Total.
	1 month.	1-3 months.	3-6 months.	6-9 months.	9-12 months.	
Measles . . . . .	2	0	4	7	5	18
Whooping cough . . . . .	0	0	0	0	0	0
Smallpox . . . . .	0	0	0	0	1	1
Chicken-pox . . . . .	0	0	0	0	0	0
Diphtheria . . . . .	0	0	0	0	0	0
Pneumonia . . . . .	0	0	0	1	0	1
Broncho-pneumonia . . . . .	0	0	0	1	0	1
Polio-myelitis . . . . .	0	0	0	0	0	0
Diarrhoea and dysentery . . . . .	5	5	5	10	6	31
Bronchitis . . . . .	4	2	2	3	2	13
Rickets . . . . .	3	2	2	1	0	8
Malaria . . . . .	1	2	4	3	5	15
Scabies . . . . .	3	1	2	5	0	11
Fever . . . . .	1	1	1	4	2	9
Common cold . . . . .	0	0	1	0	0	1
Tonillitis . . . . .	1	0	1	1	1	4
Conjunctivitis . . . . .	1	0	0	1	0	2
Infantile Cirrhosis of liver . . . . .	0	0	0	1	0	1
Aræmia . . . . .	0	0	1	0	0	1
Multiple Bolls . . . . .	0	0	1	0	0	1
Chloriæmia . . . . .	0	0	3	0	0	3
Leucæmia . . . . .	0	0	0	1	0	1
Hyperæmia . . . . .	0	0	0	1	0	1
Fulminating of liver and spleen . . . . .	0	0	0	1	0	1
TOTAL . . . . .	21	13	27	40	22	123

\* In five cases the infants suffered from two diseases at different age periods.

TABLE CLXXIII.

*Sickness during the year According to Infant's Food.*

Solid Food.	MILK.					
	Mother's only.			Mother's and fresh.		
	Total No.	Sick.	Expected No.	Total No.	Sick.	Expected No.
Nil . . . . .	148	18	32.4	50	13	10.9
Cereals . . . . .	18	7	3.9	18	8	3.9
Sago . . . . .	7	2	1.5	15	8	3.3

TABLE CLXXIV.

*Sickness per month amongst Infants According to Age.*

Period of life.	Total No.	Sick.	Per cent. of sick per month of risk.	No. of sick including fatal cases.	Per cent. of sick per month of risk including fatal cases.*
-1 month. . . . .	260	19	7.3	42	14.8
1-3 months . . . . .	231	13	2.8	17	3.6
3-6 months . . . . .	176	24	4.5	30	5.5
6-9 months . . . . .	102	40	13.0	45	14.0
9-12 months . . . . .	52	22	14.1	26	15.5

\* Assuming death at the end of the period.

From the data presented in Table CLXXIV we may obtain the average morbidity rate for infants as follows: 52 infants having lived for 12 months constitute  $52 \times 12$  or 624 person-months. Fifty or (102-52) infants having lived for 9 months constitute  $50 \times 9$  or 450 person-months and so on. Thus the total number of person months of risk is 1,712 or 143 person years. The number of sicknesses amongst infants is 123, hence the morbidity rate is 86.0 per cent. Excluding repeated illness of 5 infants, the rate is reduced to 82.5 per cent. Including fatal cases the morbidity rate (not counting repeated sickness) amounts to 96.1 per cent.

*Pre-School Child.*—A statement of the incidence of sickness at different years of life for pre-school children is given in Table CLXXV. It will be seen, that sickness rate decreases as age increases. The only exception to this well recognised rule is sickness during the first year of life, which is obviously due to incomplete information. It is probable that in grown up children illnesses of earlier life have been forgotten unless they were of serious nature. Confining our attention to sicknesses which occurred in the immediate past year we obtain results as given in Table CLXXVI where the nature of sickness is also shown. Thus it will be seen that the exception mentioned above does not hold.

As regards the nature of diseases affecting the pre-school children, measles and diarrhoeas and dysenteries rank high.



TABLE CLXXV.  
*Sickness Histories at different years of Pre-School Life.*

Age.		No. of sickness.	No. of people exposed to risk.	Per cent.
Within 1 year		185	739	25.0
Within 2 years		247	739	33.4
Within 3 years		179	376	31.1
Within 4 years		99	391	25.3
Within 5 years		26	190	13.7

TABLE CLXXVI.  
*Sickness of Pre-School Children during the Previous Years.*

Present Age.	Total children.	No. of sickness.	Nature of sickness.							
			Percentage.	Measles.	Whooping cough.	Small-pox.	Bronchitis.	Pneumonia.	Polymelitis.	Diarrhoea and Dysentery.
—2	163	70	42.9	22	1	..	3	2	..	11
—3	185	51	27.6	13	..	..	1	1	..	9
—4	175	15	8.6	5	..	..	..	..	..	1
—5	210	26	12.4	6	1	..	2	..	..	6
										31
										27
										9
										11

The Table CLXXVI compares the percentage of children who were sick within last 12 months in reference to the age at which they were weaned whatever their present age might be. It is probable that relatively more of younger children have been included in the first group than in the other four groups, but we may assume that the age factor is not differentially operating in the latter groups. The data are not sufficiently large but the advantage appears for children who were weaned between one and two years as compared with those weaned earlier or later or not yet weaned. The word weaning has been employed according to the popular (though perhaps erroneous) usage of giving up breast feeding. We may tentatively conclude that under the socio-economic conditions prevailing in the Area, weaning earlier than a year may not be conducive to good health. Is this due to great risk of infection or to lesser resistance? As regards the late weaners, the interpretation is more difficult. It may be that keeping to breast, even though it may be only partial, is not good for child's health. On the other hand, one might argue that sickly children continue breast feeding for a longer period than the healthy ones, but considering the large proportion of late weaners, this cannot be the sole explanation.

From Table CLXXVII one gets the unexpected result that milk feeds are associated with sickness. This may be partly due to want of cleanliness, as may be seen from the last columns, and partly to the fact that in a poor

community like this where milk is rather scarce, it is not given as a regular food to an average child but is given more frequently when the child is sick. Besides, it is probably linked up with age factor, that is to say, that younger children amongst whom morbidity rate is higher, receive it more frequently than the older brothers or sisters.

TABLE CLXXVII.  
*Sickness in Relation to Milk Feeding in Pre-School Children.*

	MILK FEEDING.						
	Nil.	—10 oz.	10—	Regular.	Irregular.	Clean.	Unclean.
Sick . . . . .	157	135	41	117	58	84	95
Total (sick and not sick) . .	381	287	72	239	116	197	163
Percentage . . . . .	41.2	47.0	56.9	49.0	50.0	42.6	58.3

*School Child.*—As we have previously stated the examination of school children was carried out by the School Medical Service as a routine measure. A statement of the numbers of school and of scholars in the four unions is given in Table CLXXVIII.

TABLE CLXXVIII.  
*School and Scholars According to Unions and Standards.*

Union.	SCHOOLS.			SCHOLARS BY STANDARDS.					Percentage of population.
	No.	With trained teachers.	Health programme instituted.	I	II	III	IV	Total.	
Singur . . . . .	12	12	11	371	158	151	112	792	6.5
Balnrambati . . . . .	8	6	6	280	92	62	67	501	3.4
Born . . . . .	9	4	4	160	49	56	58	323	2.3
Begumpur . . . . .	14	10	8	432	145	101	90	768	3.6
Total . . . . .	43	32	20	1243	444	370	327	2384	—

From Table CLXXVIII it is obvious that as between the 4 Unions there is great disparity in the number of schools and of children attending primary school. Since Begumpur is the most prosperous of the four Unions the economic factor could not be the sole explanation of the differences noted above. The educational advancement in Singur owes a great deal to the generous and public spirited activities of the late Mr. S. N. Mulliek, C.I.E. Another point to observe is that the children reaching the IVth standard constitute a little more than one-fourth (26.3 per cent.) of the entrants in the 1st standard which means a great wastage of educational effort. It is particularly noticeable in Begumpur and least in Singur Union. It may be also noted that the Unions differ in regard to the suitability of teachers for purposes of health training. The periodical health examination of only 632 out of a total of 2,384 children is shown in Table CLXXIX. A statement of the various defects detected and expressed as percentage of the number of children examined is contained in Table CLXXX. Malnutrition heads the list. Other

important defects are unhealthy teeth and gums, diseased or enlarged tonsils, anaemia, enlarged glands, scabies and enlarged spleen. (Cf. Similar data obtained for sample population during the survey. In many instances, differences are marked, the rates given in table CLXXX may not be applicable to the entire school population.)

TABLE CLXXXIX.

*Periodical Health Examination of Primary School Children Carried Out in 1944.*

Unions.	Scholars examined by standards.				
	I	II	III	IV	Total.
Singur . . . . .	81	99	114	72	366
Bakrambati . . . . .	0	40	31	8	79
Bora . . . . .	0	0	47	45	92
Begumpur . . . . .	0	0	53	20	73
TOTAL . . . . .	81	139	244	145	609

In table CLXXXI information is given regarding the number of children exhibiting physical defects and the percentage of defects corrected.

TABLE CLXXX.

*Percentage of School Children Showing Certain Defects.*

Defects.	Percentage.	Defects.	Percentage.
Malnutrition . . . . .	45	Refraction defects . . . . .	4
Teeth and gum . . . . .	26	Lousiness . . . . .	3
Uncleanliness . . . . .	23	Skin diseases . . . . .	3
Tonsils . . . . .	18	Otitis Media . . . . .	1.5
Anaemia . . . . .	16	Heart Disease . . . . .	1.5
Enlarged glands . . . . .	13	Gastro intestinal . . . . .	1.5
Scabies . . . . .	9	Liver trouble . . . . .	0.5
Enlarged spleen . . . . .	9	Hernia . . . . .	0.3
Avitaminosis . . . . .	6	Lung trouble . . . . .	0.3
Eye diseases . . . . .	5	Tumour . . . . .	0.3
Pharyngitis . . . . .	5		

TABLE CLXXXI.

*Defects Found in Primary School Children and Percentage Corrected.*

Unions.	No. of Children examined.	CHILDREN WITH DEFECTS.		TOTAL DEFECTS.	
		No.	Percentage.	No.	Percentage corrected.
Singur . . . . .	368	313	85.0	642	28
Bakrambati . . . . .	99	76	84.4	146	41
Bora . . . . .	92	73	79.3	208	37
Begumpur . . . . .	82	65	80.5	204	37
TOTAL . . . . .	641	527	82.2	1,200	33

From table CLXXXI it will be observed that 84 per cent. of the children exhibited one or more defects. This is a high figure, even though the standards of examination and of fitness could not have been high. However, the small amount of variations observed in the percentage of defective children in the four Unions would suggest that these standards were more or less uniformly applied. It is rather surprising that the percentage of defects corrected is lowest in Singur. A possible explanation is that the number of children examined in this Union was considerably higher than elsewhere. If that be so, the present school health service needs considerable strengthening if the

medical examination is to be extended to the whole of the primary school population and if satisfactory clinical service to the defective children is to be rendered.

### Duration of sickness.

It is customary to confine the discussion on morbidity to the incidence in various groups of population and by causes. Little attention is paid to the loss suffered by a community in terms of quality of population and man-days lost except occasionally for industrial population. In certain American studies however, information is available about the duration of all illnesses for civil populations in rural and urban areas. In dealing with the morbidity of special groups we have drawn attention to some of the remote consequences of sickness affecting the quality of the population. Here we propose to deal with the duration of sickness at different periods of life and for various diseases. The relationship between deaths and duration of sickness is also considered.

In Table CLXXXII the morbidity and mortality rates, duration of illness per sick person and per head of population as well as number of days lost per death, have been given, for different periods of life, for all diseases and for principal diseases separately. In Table CLXXXII it will be observed that, considering all the diseases, the morbidity rate decreases with age, average for all ages being 396 per mille, *i.e.*, two-fifths of the whole population is sick, at one time or the other during the year. The mortality rate also rapidly decreases with age; it reaches its minimum value at the school-going age and then rises again in later life. The contrast between infant mortality rate of 148 (based on infant population and not on births) and the school-age mortality rate of 5 is remarkable. For all ages the mortality rate is 24 per mille. On the other hand, the number of days of sickness per sick person, increases with age till the school-going age when it is as high as 52 days. It practically stays at that value, being 51.5 for adults. The average period of sickness per case is 50 days. This is a high figure indeed, and it shows that minor sicknesses have been omitted. It is true, that these estimates are based on crude information and, as we shall see, the prolonged illness is mainly referable to Malaria and Diarrhoea and Dysentery. Even so, one cannot but be impressed with the slow rate of recovery amongst these people once they are ill, which may be due partly to the absence of efficient treatment (*see* page 68) but it may be chiefly ascribed to the lack of adequate response on the part of the tissues.

TABLE CLXXXII.

*Morbidity Rate, Mortality Rate and Duration of Sickness for All Diseases and for Different Stations of Life.*

Periods of life.	Morbidity rate per mille.	Mortality rate per mille.	Duration of sickness in days.			
			Per Sick person.	Per head of population exclusive of fatal cases.	Per head of population inclusive of fatal cases.	Per death.
Infant . . . .	527	148±0.0	27.6	12.4	10.7	105
Pre-school . . . .	450	40±0.5	42.5	20.0	21.4	477
School . . . .	431	5±1.5	51.0	22.0	22.7	3,808
Adult . . . .	357	21±2.1	51.5	18.4	19.5	872
All ages . . . .	396	24±1.7	49.0	19.6	21.0	800

NOTE.—English figure for industrial worker 1924-35 is 3.3 to 9.2 days.

The loss of time due to sickness per head of population in the various age groups also increases with age up to school-age and later decreases slightly. Thus, the loss per head of population in the school-going age (including those who fell sick and those who did not) is a whole working month. A loss of eighteen and a half days per head of adult population, 19.6 days for all ages, must be serious economic loss to the family and to the community. In these estimates fatal cases have not been included. Taking these cases into account, one more day has to be added for the loss suffered by adult and a day and a half, for all ages. We have no comparable figures for other communities in this country but the results of certain American studies may be given here. In 1938, a survey of 308 rural families (Hollingsworth and Klein, 1943) with a membership of 1,250 persons belonging to the Standard Unsted community in a petroleum area, Arkansas, was carried out by collecting data referable to the preceding 12 months from the date of study. The average number of days of illness varied between 9.1 and 15.5 per person for different age groups. In another rural community belonging to 21 South Carolina cotton-mill villages were collected for 22,000 persons. The average duration of disabling illness per person of all ages was found to be 9.3 days. It varied between 3.1 days for children 5-9 years and 22.1 for old persons above 55 years (see Table CLXXXIII). Thus, apart from the temporary and permanent loss in efficiency due to sickness, a loss of such a large number of working days must necessarily be a handicap of considerable magnitude, to any nation aspiring for industrial independence.

TABLE CLXXXIII.

*Disabling Illness ; Average Number of Days per Person by Age Group in 24 South Carolina Cotton-Mill Villages, April-December 1917 (22,000 White persons).*

Age Group.	Average annual number of days of disabling illness per person.
All ages . . . . .	9.3
Under 5 . . . . .	8.0
5-9 . . . . .	3.1
10-14 . . . . .	4.4
15-24 . . . . .	7.6
25-34 . . . . .	9.2
35-44 . . . . .	9.4
45-54 . . . . .	12.7
55 and Over . . . . .	22.1

Taking all ages together and including the fatal cases each individual in this area, on an average, loses 21 days in the year through sickness. This is a tremendous loss. Again, for each death that occurs the community loses 800 man-days through sickness or to put it in another way, with each death one individual may be considered not only out of commission for two years and two months but also a charge on the community for maintenance, nursing and treatment. How many people realize this significance of the mortality statistics? But this is not all, because the loss so suffered is by no means

uniformly spread over the various periods of life. The infants whose economic value of time is *nil* suffer less than one-eighth the loss in person days as compared to the adult. Pre-school children also lose a relatively shorter period for each death. The adults lose 872 man-days or 2 years four months and 22 days for an individual, per death, but phenomenal loss occurs in the case of school child. When a child of school-going age dies this group of persons lose 3,898 man-days or 10 years, 8 months and 8 days through sickness. The death rate being  $5 \pm 1.5$ , its maximum value may be reasonably be taken as 8 in which the man-days lost per death would be reduced to 2,436 which is still a large number. This is because low death rate in this age group is coupled with high morbidity rate and long duration of sickness. As we have already seen (page 71) the children attending school have a higher morbidity rate than children of school-going age not attending school. Thus if, as we expect, there is a general and rapid extension of education in the near future without corresponding improvement in the control of diseases, we may be faced with an even worse situation than at present. The educational authorities will do well to take a note of this observation for they must make sure that their high object is not defeated through excessive morbidity rate amongst the children.

TABLE CLXXXIV.

*Morbidity Rate, Mortality Rate and Duration of Sickness for Malaria and for Different Stations of Life.*

	Morbidity rate per mille.	Mortality rate per mille.	Duration of sickness in days.			
			Per sick person.	Per head of pop. exclusive of fatal cases.	Per head of pop. inclusive of fatal cases.	Per death.
Infant . . .	73	$10.6 \pm 5.0$	45.7	2.6	3.1	274
Pre-school . . .	257	$12.5 \pm 3.8$	49.7	12.1	12.8	877
School . . .	317	$2.1 \pm 1.0$	63.0	20.2	20.3	8,065
Adults . . .	253	$4.2 \pm 0.9$	52.0	13.0	13.3	2,847
All Ages . . .	260	$4.8 \pm 0.8$	57.4	14.9	15.2	2,590

Let us now consider a few important diseases individually. Unlike overall morbidity rate, malaria rate increases with age till the school-age and then declines in adult life—the average of all ages being 260 per mille as against 396 for all diseases (*see* Table CLXXXII). Morbidity rate, on the other hand, follows the same course as the overall mortality rate, being lowest at school age. The rate for all ages is 4.7 as against 24 per mille for all diseases. A point of special interest is the high mortality rate (10.6) for infants with a low morbidity rate, thereby emphasising the high case fatality rate in malaria amongst infants which is a fact generally accepted by malariologists. The greatest loss, however, occurs amongst pre-school children and least amongst the school children though the morbidity rate is the highest in the latter. Duration of sickness per malaria case is also longest in this group being over two months. It would appear that the shorter duration of sickness amongst pre-school children and particularly amongst infants is largely due to speedier fatal end but probably also partly due to quicker recovery in the case of survivors. The stalemate between disease and resistance is reached at school

age with more frequent victory for the latter than in any other age period. Later in adult life the period of sickness decreases but the death rate is doubled. The significance of this observation cannot be properly understood unless adolescents, adults and old people are separately considered. The average period of malaria fever, for all ages is 57 and a half days—a pretty long period which is frequently broken up by a number of intervals of intermission. Of all periods of life the school-age suffers the greatest loss of time from malaria; indeed, major part of the time lost through sickness at school age is due to malaria.

The loss per head suffered by infant population from malaria is relatively small being only 3 days as against 20 days by the children of school going age, and 13 by the pre-school and adult populations. For all ages, half a month per head of population is lost through malaria every year.

Man-days lost per death from malaria is enormous for school-age children viz., 8,665 or 23 years and 9 months in terms of an individual. Loss for adults is also considerable, though not as high as for the school age children, being 2,847 man-days or 7 years, 9 months and 22 days for a person.

Dysenteries and diarrhoeas are particularly hard on infants as both morbidity and mortality rate are absolutely and relatively high. The pre-school child also fares badly in regard to both these rates but the school-age child is the least affected (see Table CLXXXV). These affections to a certain extent increase in importance in adult life but nothing like infancy or early childhood. The average period of sickness for all ages is 41 days. It is lowest in case of infants, viz. 16 days. For other periods of life it varies but comparatively little being round about 44. Unlike malaria the school child is detained by dysentery or diarrhoea for almost a week less than either the pre-school child or the adult. In this case the loss per head of population is the greatest for the pre-school child and the least for the school age population. Average for all ages is 1.8 days.

TABLE CLXXXV.

*Morbidity Rate, Mortality Rate and Duration of Sickness for Dysentery and Diarrhoea and for Different Stations of Life.*

Periods of life.	Morbidity rate per mille.	Mortality rate per mille.	Duration of sickness in days.			
			Per sick person.	Per head of pop. exclusive of fatal cases.	Per head of pop. inclusive of fatal cases.	Per death
Infant . . .	150	21.2±8.0	16.0	1.0	2.3	90
Pre-school . . .	60	10.0±3.3	47.4	3.3	3.5	338
School . . .	21	1.0±0.7	41.0	1.0	1.0	861
Adults . . .	37	2.2±0.7	47.1	1.6	1.8	722
All ages . . .	38	3.3±0.7	41.2	1.6	1.8	460

Loss of man-days per death from dysentery and diarrhoea is small compared to malaria, the average for all ages being 460 man-days. The school-age child as usual loses the largest number of man-days per death, it being

861 followed by the adult with 722 man-days. Infants lose 99 man-days and the pre-school children 338 only. In terms of an individual the loss per death per infant, pre-school child, school-age child and adult is 3 months 9 days, 11 months 8 days, 2 years four and a half months and 1 year 7 months 7 days respectively.

Measles mostly affect the pre-school child, the morbidity rate being 147 as against 69 for the infant and 73 for school-age child (*see* Table CLXXXVI). For the adults the morbidity rate is only 6 per mille. No deaths occurred at any period of life. The period of sickness varies little for the various periods of life, the lowest being 7.4 days for infants and the highest 9.3 days for pre-school children. The average for all ages is 8.3 days. Per head of population measles causes a loss of a day and a half in the case of the pre-school child and half a day each for the infant and the school-age child. For the adults the loss of time through measles is negligible.

TABLE CLXXXVI.

*Morbidity Rate, Mortality Rate and Duration of Sickness for Measles and for Different Stations of Life.*

Periods of life.	Morbidity rate per mille.	Mortality rate per mille.	Duration of sickness in days.			
			Per sick person.	Per head of population exclusive of fatal cases.	Per head of population inclusive of fatal cases.	Per death.
Infant . . .	60	0	7.4	0.5	0.5	Does not arise.
Pre-school . . .	147	0	9.3	1.4	1.4	"
School . . .	73	0	8.2	0.6	0.6	"
Adults . . .	6	0	8.5	0.05	0.05	"
All ages . . .	42	0	8.3	0.35	0.35	"

TABLE CLXXXVII.

*Morbidity Rate, Mortality Rate and Duration of Sickness for Pneumonia and for Different Stations of Life.*

Periods of life.	Morbidity rate per mille.	Mortality rate per mille.	Duration of sickness in days.			
			Per sick person.	Per head of population exclusive of fatal cases.	Per head of population inclusive of fatal cases.	Per death.
Infant . . .	4	0	26.0	0.1	0.1	Does not arise.
Pre-school . . .	7	0	24.2	0.2	0.2	"
School . . .	3	0	21.6	0.1	0.1	"
Adults . . .	8	1.7±0.6	44.5	0.3	0.4	222
All ages . . .	6	1.0±0.4	36.2	0.2	0.3	111

Pneumonia is not a common disease, the average morbidity rate for all ages being 6 per mille. The adults and the pre-school children suffer more



than others, the morbidity rates being 8 and 7 respectively (see Table CLXXXVII). Deaths were recorded only amongst adults, the mortality rate being 1.7. Average period of sickness for a case of pneumonia is 36 days, being highest viz., 44.5 days for the adults, 24 days for the pre-school children and 22 days for school-age children. The loss of time per head of population is relatively trivial being less than quarter of a day. The adults lost 222 man-days or 7 months and 12 days in terms of an individual.

TABLE CLXXXVIII.

*Morbidity Rate, Mortality Rate and duration of Sickness for Influenza and for Different Stations of Life.*

Periods of life.	Morbidity rate per mille.	Mortality rate per mille.	Duration of sickness in days.			
			Per sick person.	Per head of population exclusive of fatal cases.	Per head of population inclusive of fatal cases.	Per death.
Infant . . .	4	0	10.0	0.01	0.01	Does not arise.
Pre-school . . .	3	0	6.0	0.02	0.02	"
School . . .	6	0	6.0	0.04	0.04	"
Adults . . .	7	0	8.5	0.06	0.06	"
All ages . . .	6	0	8.3	0.05	0.05	"

Influenza is even less common than pneumonia, the morbidity-rate for all ages is only 6 per mille. It is 7 per mille for adults, 6 for school-age children, 3 for pre-school children and 4 for infants (see Table CLXXXVIII). No deaths occurred. The average period of sickness per case is 8.5 days for adults and 6 days for the school-age children. Loss per head of population is nominal.

From this limited experience it may be stated that dysenteries and diarrhoeas and malaria are the most important diseases as life risks for infants and young children. They are also responsible for huge loss of time at all ages, particularly the school-age and the adult life.

#### Investigation of Infectious Diseases.

In our present stage of development of community health in this country the investigation and control of infectious diseases justly claim a high priority in the scheme of public health organisation. Not only do these diseases carry away a large number of victims every year but they are also responsible for a considerable loss of working time and for undermining the national health and efficiency entailing enormous loss of national income and productive capacity. An important feature of the acute infectious diseases is their great variability in regard to parts of the country involved and the seasonal and annual incidences. Their anticipation and early detection and control are matters of utmost importance. Much basic knowledge can be acquired by scientifically conducting routine local investigations and properly interpreting results. This knowledge may greatly help in the satisfactory control of these diseases. For systematic epidemiological investigation proper training and experience are required which are not infrequently lacking in officials charged with these duties.

To assist routine investigations we have designed a special schedule which will be found in Appendix II. This schedule can be satisfactorily handled by trained and experienced workers only. In the present study such training could not always be arranged and consequently results were sometimes not entirely satisfactory. However, some remarks on the cases studied have been made below for each disease separately.

*Tuberculosis.*—Mantoux test on general population is the minimum requirement for the investigation of tuberculosis problem but for a proper discussion of the epidemiological features of this disease expert reading of skiagrams is essential. As a matter of fact we have to await the introduction of the mass skiagraphy for essential knowledge of the disease. These specialised techniques were not employed in the present survey but in view of the social importance of the disease it is suggested that whenever feasible the survey staff should include a physician with expert knowledge of tuberculosis and arrangement should be made for miniature mass skiagraphy specially when urban communities are the subject of investigation. From the crude data obtained in the present study we gather that except in one case the disease was recognised for the first time during the Survey. The duration of sickness varied from 20 days to 4 years. In many instances a near relative was the probable source of infection. Except in one case, conditions for the spread of infection were most favourable and many persons were exposed. Patients depended upon relative for nursing but in one instance there was no attendant. With one exception there was no evidence of conscious effort on the part of the patient or the attendants to prevent spread of infection. This was ascribed to lack of knowledge of the mode of transmission of the disease and to poverty. None but one patient received outside assistance and that was from a non-official source. The estimated economic strain on the family due to loss of wages and to expenses in connection with sickness varied from Rs. 5 to 200 per month.

*Leprosy.*—There were three lepers, one of which had been notified although they were cases of old standing namely, of 6 to 15 years duration. The disease was believed to have been contracted from patient's father in one case, in the other two cases the source of infection was not known. The clinical evidence suggested infectious nature of two patients but in the third case the investigator was not certain. Many susceptible persons were being exposed to infection. No conscious efforts were in evidence to prevent the spread of the disease. Only in one case the family possessed knowledge of the mode of transmission. One patient was being nursed by relatives, other two were not being attended to. None of them received any outside assistance. The financial loss suffered by the family amounted to Rs. 180 per annum in one case and Rs. 100 per year in another. No economic loss was suffered by the third family.

*Measles.*—None of the five measles cases had been notified. For one case it is claimed that a previous attack of measles had occurred two years ago. One patient was in the second and the other on the 4th day of the disease at the time of visit, others were 10 or 11 days old. Thus two of them may be presumed as infectious. They were in contact with many susceptible children. A previous case in the family or amongst a neighbour account for infection in 3 instances. In other two cases the source of infection could not be traced. All the patients were being nursed by relatives and none of them received any

outside assistance. None of the families had definite ideas of the mode of transmission of the disease and no efforts had been made to safeguard the susceptible children. Economic loss was estimated by one family as Rs. 18 per month. No pecuniary loss was sustained by other families.

*Typhoid*.—There were only two cases at the time of the survey, one having been notified by the attending physician and the other by 'chowkidar'. Both were first attacks, one of them was in the 4th and the other in the 5th week of the disease. They had not been previously immunised. In one case the patient is believed to have been infected from a known carrier with whom he had been in close contact during the previous 3 weeks. In the other case the source of infection could not be traced but he partly boarded outside. Both of these patients were presumably infectious. One of them was satisfactorily isolated, the other was not. Both were being nursed by relatives. Besides, one of them received official and the other non-official outside assistance. Conscious efforts to prevent the spread of the disease were observable in one case but not in the other because of the vague ideas about the method of transmission held by that family. The monthly monetary loss suffered on account of the sickness was estimated at Rs. 10 in one case and Rs. 40 in the other.

*Smallpox*.—A case of smallpox of 8 days duration was investigated. It had not been notified, source of infection could not be traced, but it is probable that he was infected at the Railway Workshop where he worked. The patient was infectious and was in a position to transmit infection to others. No conscious effort was being made to prevent the spread of the disease. The family was responsive but ignorant regarding causation. He was being nursed by relatives and outside assistance was being received. Being the head of the family and the only earning member, financial loss was considerable and was estimated at Rs. 75 a month.

*Chicken pox*.—One case of 10 days duration was investigated. The source of infection could not be traced. She was infectious and was in a position to infect others. Probably she infected her brother during the incubation period. The patient was being nursed by relatives and no outside assistance was being received. The family did not suffer any pecuniary loss on account of this case.

*Mumps*.—Two cases of mumps were investigated, neither had been notified. The source of infection could not be traced. One case was of 3 days and the other of 14 days duration. Both were presumed to be infectious and were in a position to infect others. Nursing was being done by relatives, no outside assistance or advice was being given. The families did not possess knowledge of the method of transmission and no conscious effort was being made to prevent the spread.

#### The Infectious Diseases Service.

The survey commenced synchronously with the inauguration of the activities of the reorganised public health administration in the Centre, and continued for the first 7 months. Since the sickness records refer to previous year from the date of investigation of families it is evident that the majority of the cases would have occurred before those activities could have reached them. Besides, the reorganisation would naturally take time to develop to its full structure. Hence for a numerical estimation of the services given to

the cases of notifiable diseases before the institution of the reorganised scheme we may subtract  $\frac{1}{3}$ th as the contribution of the new administration from the total service rendered. As may be seen from table CLXXXIX of the 660 cases of notifiable disease recorded during the survey only 2.9 per cent. received diagnostic visits, 0.2 per cent. supervisory visits and 0.3 per cent. terminal visits. Percentage of cases receiving any kind of visit is also shown in the table. The numbers are small, but it would appear that the visits are practically restricted to cases of cholera and smallpox. If we deduct  $\frac{1}{3}$ th from the number of visits paid, there would be no material change in the description of the infectious disease service at the time of introduction of the reorganisation scheme. It is not possible in a survey like this to go into the details of the quality of the services, but these data should provide a rough base to measure the improvement that might be effected in the control of infectious diseases under the reorganised scheme, through a subsequent survey.

TABLE CLXXXIX.

*Services Rendered in Cases of Notifiable Diseases.*

Name of disease.	Nature of Service.					Total.
	Nil.	Diagnostic.	Supervisory.	Terminal.	Percentage of visits paid.	
Chicken pox . . . . .	16	..	..	..	..	16
Cholera . . . . .	18	2	..	2	18.2	22
Diarrhoea & dysentery . . . . .	240	6	1	..	2.8	247
Diphtheria . . . . .	1	..	..	..	..	1
Measles . . . . .	269	4	..	..	1.5	273
Meningitis . . . . .	1	..	..	..	..	1
Mumps . . . . .	4	..	..	..	..	4
Pneumonia . . . . .	37	2	..	..	5.1	39
Smallpox . . . . .	6	2	..	..	25.0	8
T B . . . . .	7	..	..	..	..	7
Typhoid and paratyphoid . . . . .	39	3	..	..	7.1	42
Total . . . . .	638	19	1	2	3.3	660

**Assessment of Routine Vital Statistics.**

An account of the present method of the collection of Vital Statistics and of the proposed improvements according to the Reorganisation Scheme has been given in Chapter IV. A few remarks regarding them are offered here. Both the sample and the routine data relate to 1943.

*Births.*—Birth rate of the sample population is  $42.6 \pm 2.27$  as against 30.5 according to the routine statistical data for the whole population. Since the latter figure is significantly lower than the estimate obtained in the survey it

is evident that quite a number of births have not been recorded. This is in accordance with the experience of the workers in the Maternity and Child Welfare Section of the Institute.

Since one of the primary objects of the Singur Health Reorganisation is to improve the recording of the Vital Statistics, it will be of interest to see what progress has been made when a similar comparison is carried out at a later date.

*Deaths.*—A statement of death rates by causes for the whole population as obtained from the routine statistics and for the sample population is given in Table CLXXXX. The death rate works out at 19.5 instead of 22.8  $\pm 1.41$  for the sample population. The sample rate just fails to include the death rate of the community within the range at 5 per cent. level. Since there is a possibility of failure in registering deaths, it is more than likely that the sample rate is nearer the true value than the rate based on routine statistical data.

As regards the specific death rates it will be observed that more deaths are ascribed to ill-defined or popular diseases, 'other fevers', 'other respiratory diseases' and 'malaria' in routine statistics than in the survey data. The difference between the two returns is particularly noticeable under the head 'miscellaneous'. Besides, there are many causes of death like nephritis, ascites, asphyxia neonatorum, tetanus, hemiplegia, Kala-azar, diabetes, asthma and intestinal obstruction which are not mentioned in routine statistics. In fact, no special causes of neonatal deaths have been given by the *chowkidars*. A few deaths due to causes like suicide, snake-bite, measles and whooping cough which are shown in the *chowkidars'* return are not represented in the survey material. These are not significant causes. It may therefore be said that the survey material gives a truer picture of the incidence of fatal diseases in the community than do the routine statistics.

A comparison between the routine statistics and the sample may also be made in respect of infant mortality rate. This rate is subject to error from two sources, viz., of incomplete recording of births and of incomplete recording of infant deaths. Since as we have seen the record of births is more incomplete than that of deaths, the infant death rate compiled from the routine statistics should be greater than the true value. This does not appear to be the case for the infant mortality rate actually obtained. According to the survey material it is  $137 \pm 18$  as against 119 according to the routine data. Thus it is evident that a large proportion of infant deaths have not been recorded by the *chowkidars*.

The maternal death rate according to the routine statistics is 6.2 per 1,000 births. Since more births have actually occurred than have been recorded, the maternal mortality rate would be still lower than the true value. In the sample population the maternal death rate is  $12.6 \pm 5.7$ . With such a high standard deviation this sample fails to give sufficiently precise information to permit discussion as regard the accuracy of the routine statistics for this item. A much larger sample is required.

TABLE CXC.

*Death Rates by Causes During the Year (1943) Compared With the Data of Routine Vital Statistics Collection (Chowkidars' Return).*

Cause of Death.	General Health Survey.	Routine Vital Statistics.	Cause of Death.	General Health Survey.	Routine Vital Statistics.
	Rates per 100,000	Rates per 100,000		Rates per 100,000	Rates per 100,000
Malaria . . . . .	482	498	Hemiplegia . . . . .	28	0
Diarrhoea & dysentery . . . . .	354	187	Smallpox . . . . .	28	3
Cholera . . . . .	170	145	Beri beri . . . . .	14	2
Prematurity . . . . .	156	0	Diabetes . . . . .	14	0
Other Fevers . . . . .	128	394	Kala-azar . . . . .	14	0
Pneumonia . . . . .	99	89	Asthma . . . . .	14	0
Typhoid & paratyphoid . . . . .	85	73	Intestinal obstruction . . . . .	14	0
Marasmus . . . . .	71	0	Other Respiratory diseases . . . . .	14	29
Nephritis . . . . .	71	0	Wells' disease . . . . .	14	0
Accidents other than snake-bite . . . . .	71	54	Acute Arthritis (Traumatic) . . . . .	14	0
Childbirth & anæmia of pregnancy . . . . .	57	19	Starvation . . . . .	14	0
Tuberculosis . . . . .	57	89	Miscellaneous . . . . .	43	317
Ascites . . . . .	57	0	Epidemic Dropsy . . . . .	0	2
Asphyxia Neonatorum . . . . .	43	0	Suicide . . . . .	0	16
Tetanus . . . . .	43	0	Snake-bite . . . . .	0	16
Senility . . . . .	43	0	Measles . . . . .	0	2
Congenital debility & Malformations . . . . .	28	0	Whooping Cough . . . . .	0	10
Leprosy . . . . .	28	3	Causes unknown . . . . .	43	0
Syphilis . . . . .	28	0	All causes . . . . .	2,367	1,950
Cancer . . . . .	28	2			

## CHAPTER XII.

## DISABILITIES.

Disabilities found in the sample population were partial deafness, loss of limbs (which included paralysis), partial blindness, complete blindness, deaf-mutism, complete deafness and kyphosis. Altogether 1.63 per cent. of the population suffered from one or more disabilities, six persons being disabled in more than one way. For principal disabilities the rates were as follows:—Partial deafness— $0.6 \pm 0.1$  per cent., loss of limb  $0.5 \pm 0.1$  per cent., partial blindness— $0.4 \pm 0.1$  per cent., complete blindness— $0.1 \pm 0.04$  per cent., deaf-mutism— $0.06 \pm 0.03$  per cent. One person was completely deaf, 2 were suffering for kyphosis and one had hare-lips. By sexes the disability rates were 2.1 per cent. for the males and 1.4 per cent. for the females, the difference being accounted for mostly by partial deafness and by loss of limb, as may be seen from Table CXCI. The difference between the two rates is significant ( $0.7 \pm 0.3$ ), the reasons for which are not understood.

TABLE CXCI.

*Distribution of Disabilities According to Sexes in Sample Population.*

Disabilities.	Partial-ly deaf.	Com-pletely deaf.	Deaf mutc.	Partial-ly blind.	Com-pletely blind.	Loss of limb.	Kyphosis.	Hare-lips.	Total.	Rate per cent.
Male . .	26	..	3	15	2	22	1	1	70	2.1
Rate (%) .	0.8	..	0.1	0.5	0.1	0.7	0.3	.03	..	..
Female . .	12	1	1	13	5	9	1	..	42	1.4
Rate (%) .	0.4	0.03	0.03	0.4	0.2	0.3	.03	..	..	..

Disabilities according to occupation are shown in Table CXCVI. The incidence of disabilities was highest among 'other labourers'. The figures are small, but the cultivators and the 'liberal professions' also had high incidence of disabilities. Amongst those staying at home are included one person completely deaf, 7 completely blind, 18 with loss of limbs and 2 with kyphosis. It is obvious that in many of them the reasons for their being at home was the incapacitating disabilities. This also shows how at least 19 partially deaf persons, 10 partially blind persons and as many as 11 persons with loss of limb carry on with their work in spite of their handicaps. The study of the causes of disabilities is instructive (*see* Table CXCVI) because nearly three-fourths of them have arisen from diseases, and 7.1 per cent. from accidents. Many of the disabilities should therefore be preventable. As regards the 15 cases of congenital disabilities special investigation might reveal preventable causes in at least some of them. Thus the 3 partially blind and the 5 persons with loss of limb might have been saved if proper care had been taken at the time of birth. It may therefore be said that considerable improvement in the quality of population could be achieved by the prevention of disease and accidents and also of some of the causes of congenital defects. From Table CXCVI it would appear that considerable amount of disabilities is to be found in people over 50 years of age, but even in active age groups, *i.e.*, between 25 and 50 years also the incidence of disabilities is not inconsiderable.

TABLE CXCH.

*Distribution of Disabilities According to Age in the Sample Population.*

Disabilities.	Age.												Total.
	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	55-	
Partially deaf .	1	3	2	1	..	2	1	3	5	2	4	14	38
Completely deaf	..	..	..	..	..	..	..	..	..	..	..	1	1
Deaf-mute .	..	2	1	..	..	1	..	..	..	..	..	..	4
Partially blind .	4	1	..	..	..	2	..	2	2	..	4	13	28
Completely blind	..	..	..	..	..	..	1	..	..	..	1	5	7
Loss of Limb .	2	3	1	..	2	1	2	2	2	1	3	12	31
Kyphosis .	..	..	..	..	..	..	..	..	1	..	..	1	2
Hare-lips .	..	1	..	..	..	..	..	..	..	..	..	..	1
Number disabled	7	10	4	1	2	6	4	7	10	3	12	46	112
Per cent. disabled	0.7	1.0	0.5	0.2	0.4	1.3	0.8	2.0	3.0	1.5	5.1	9.3	..
Population in each group.	950	970	741	532	508	480	485	358	347	200	236	404	6,888

TABLE CXCH.

*Distribution of Disabilities According to Occupation in the Sample Population.\**

Disabilities.	Liberal profession.	At school.	At Home.	Shop keeper.	Cultivator.	Industrial labourer.	Other labourer.	Total.
Partially deaf .	1	1	19	0	9	0	8	38
Completely deaf .	0	0	1	0	0	0	0	1
Deaf mute .	0	0	4	0	0	0	0	4
Partially blind .	0	0	18	1	6	0	3	28
Completely blind	0	0	7	0	0	0	0	7
Loss of limb .	0	1	20	0	0	1	0	31
Kyphosis .	0	0	2	0	0	0	0	2
Hare-lips .	0	0	0	0	1	0	0	1
Population in each group.	45	303	4,024	137	1,172	124	446	..
Percentage of disabled in each group.	2.3	0.5	1.8	0.7	2.1	0.8	2.5	..

\* No disabilities were recorded amongst landlords, artisans, and transport labourers.



TABLE CXCV.

*Distribution of Disabilities According to Causes in the Sample Population.*

Disabilities.	Causes.				
	Congenital.	Accident.	Disease.	Not known.	Total.
Partially deaf . . . . .	4	6	31	3	38
Completely deaf . . . . .	0	0	1	0	1
Deaf-mute . . . . .	2	0	2	0	4
Partially blind . . . . .	3	1	21	3	28
Completely blind . . . . .	0	0	7	0	7
Loss of limb . . . . .	5	7	19	0	31
Kyphosis . . . . .	0	0	2	0	2
Hare-lips . . . . .	1	0	0	0	1
Total	15	8	83	6	112

Partial deafness, partial blindness and loss of limb are the chief causes of disabilities in these age groups. From the Table CXCV it will be seen that while the type of addiction does not make any difference as regards incidence of disabilities, there is distinctly higher number amongst the addicts of tobacco smoking, alcohol and opium, as compared with the non-addicts; but these differences may be largely due to the age composition of addicts and non-addicts, for it has been seen that the disability rates are higher in older age groups than the younger age groups.

TABLE CXCV.

*Distribution of Disabilities According to Addiction in the Sample Population.*

Disabilities.	Addiction.						
	Nu.	Smoking.	Alcohol.	Opium.	Charas.	Bhang.	Others.
Partially deaf . . . . .	15	10	1	2	0	0	1
Completely deaf . . . . .	1	0	0	0	0	0	0
Deaf-mute . . . . .	4	0	0	0	0	0	0
Partially blind . . . . .	10	11	1	0	0	0	0
Completely blind . . . . .	6	1	0	0	0	0	0
Hare-lips . . . . .	1	0	0	0	0	0	0
Kyphosis . . . . .	1	1	0	0	0	0	0
Loss of limb . . . . .	17	13	1	0	0	0	0
Number of disabled . . . . .	61	45	3	2	0	0	1
Population in each group . . . . .	4,732	1,507	70	56	1	6	207
Percentage . . . . .	1.3	3.0	3.8	3.6	..	..	0.5
							1.7

## CHAPTER XIII.

## SUMMARY AND DISCUSSION.

In the preceding pages an attempt has been made to briefly describe the method of conducting a general health survey of Singur Health Centre. The Survey area comprised of 4 Unions viz., Singur, Balarambati, Bora and Begumpur. Singur, the Headquarters of the Centre is situated 21 miles north-west of Calcutta. The area of the Centre is about 33 square miles. It has a population of 62,700 distributed in 68 villages and 11,390 families. For purposes of investigation a random sample of 1,197 families having 7,058 members was drawn. Sub-samples of various sizes were made for certain special investigations.

Field work was carried out for eight months from the 3rd January 1944, mainly by 4 parties each consisting of a medical and an auxiliary personnel according to a detailed predetermined plan. Information was recorded on appropriate schedules. This included particulars about individuals, families, houses, schools, villages and services. The indices of vitality and health have been presented according to the International System devised by Stouman and Falk (*loc. cit.*). The objects of the survey have been briefly stated on page 2 and we may now review the results in relation to these objects.

I. An integrated picture of health conditions and some of the factors influencing the community health.

We have presented the main portion of the health picture of the community in Chapters X, XI and XII to which reference may be made. This should be supplemented by reference to Chapters IV and VIII in which the general physical condition and the nutritional state of the community have been discussed. To further complete the picture, material will be found in Chapter III which gives an outline of health indices and in Chapter VI which contains a brief discussion of births and deaths. The reproductive capacity of the women, the developmental progress of infants and pre-school children and the physical defects discovered in school children are described in Chapter VII.

The central facts in regard to the health conditions may be briefly stated thus—

Twelve per cent. of the population may be found unwell at any time. Of this over 1 per cent. are acutely ill, over 2 per cent. are chronically ill and over 8 per cent. are in indifferent state of health. During the twelve months preceding the date of investigation 42 per cent. of the population had had one or more illnesses which were sufficiently serious not to be forgotten. Besides, 1.6 per cent. of the population are more or less handicapped on account of one or more disabilities. Clinically recognisable malnutrition is widely prevalent, 43 per cent. of the population being generally ill-nourished, 28 per cent. being deficient in Vitamin A, 10 per cent. in Vitamin D, 7 per cent. in Vitamin B<sub>2</sub> and 1 per cent. each in Vitamins B<sub>1</sub> and C; 39 per cent. is suffering from iron deficiency.

These rates are subject to sampling error which, in most instances, should not materially alter the conclusions when applied to the whole population (*see* Chapter I). In round numbers, it may be stated that of the 62,700 persons there will be found 7,274 sick or sickly persons of which 690 will be acutely ill, 1,317 chronically ill and 5,267 in indifferent state of health. As many as

26,334 individuals will have either recovered or died from various illnesses during the preceding 12 months. In addition, the community will be found burdened with about 1,000 disabled persons. General malnutrition will be exhibited by 26,961, iron deficiency by 24,453 and deficiencies of Vitamin A by 17,556, of Vitamin D by 6,270, of Vitamin B<sub>2</sub> by 4,829 and of Vitamins B<sub>1</sub> and C each by 627 persons.

Physically these people are poorly developed. The average weight of a male infant is 13 pounds and height 23 inches against American normals of 18 pounds and 26 inches respectively. By the time he is one year old, the American baby has already stolen a march equivalent of one year over his brother in Singur. The divergence between the two steadily increases till between the 16th and 17th year the Singur boy shows a lag of about three and half year. Without burdening the discussion with further numerical data it may be stated that the Singur child is poorly developed age for age as compared with his compatriots of even the poor Bengali families in Calcutta or children from other parts of the country for whom data are available.

The physical backwardness is associated with retarded functional development, as evidenced by delay in his ability to raise the head, to sit, to crawl, to stand without support and to walk or run about. The eruption of teeth and the closing of anterior fontanelle are also delayed. His speech develops later than usual.

The corrected birth and death rates are 43.8 and 23.7 respectively, the former being higher and the latter being at par with the all-India figures. Infant mortality rate is 137 (male—200, female—84), still-birth rate is 32, neonatal mortality rate is 75 and maternal mortality rate is 12.6. These rates compare somewhat favourably with all-India experience. Of those who had had sickness during the year 11.4 per cent. suffered from another disease also.

The most unhealthy months are August and September when malaria is largely prevalent while in April and May the incidence of illnesses is at its lowest. During winter months measles and other droplet infections are common.

Amongst the causes of sickness malaria heads the list, followed by measles, diarrhoeas and dysenteries, other fevers, typhoid and paratyphoid, pneumonias, influenza, cholera, asthma, chicken pox, skin diseases, rheumatic fever, small-pox, scabies, tuberculosis, puerperal fevers and venereal diseases in descending order of incidence. Amongst less important diseases leprosy, nephritis, diseases of heart, diseases of liver, diseases of ear, mumps and cataract may be mentioned.

The survey was carried out mostly during the non-malaria season and yet 1.1 per cent. of the population was found suffering from the disease or to put it differently, 37.4 per cent. of the sickness was caused by malaria. During the preceding year 26 per cent. of the population had had attacks of malaria and the disease constituted 61 per cent. of the total sickness. It is believed to have killed 48 persons per 10,000 population.

The spleen rate for children under 10 years was 17.7 and it was 12.1 per cent. for persons above that age. It was higher amongst the males than amongst the females and a double rise was noticed involving older children and elderly people. Amongst persons who had had malaria during the year spleen rate was 34 per cent. for 'well' persons, 70 per cent. for acutely ill,

87 per cent. for chronically ill and 54 per cent. for those in indifferent health. The average parasite rate was 3.4 per cent. It was 5.3 per cent. amongst children under 10 years and 2.6 per cent. amongst older people; gametocyte rates were 40 and 37 per cent. respectively in the two groups.

During the preceding 12 months measles was prevalent in an epidemic form causing a morbidity rate of 4.8 per cent. It accounted for 10 per cent. of all sickness but caused no deaths. Diarrhoeas and dysenteries were common ailments causing a morbidity rate of 3.8 per cent. and accounting for 8.8 per cent. of all sickness. The mortality rate was 35.4 per 10,000 population.

'Other fevers' which remain unclassified caused a morbidity rate of 1.4 per cent. and a mortality rate of 12.8 per 10,000 population.

Typhoid morbidity rate was 0.6 per cent. and mortality rate 8.5 per 10,000 population.

Influenza and pneumonia were of equal importance each causing a little less than 0.6 per cent. morbidity rate. The mortality rate for pneumonia was 9.9 per 10,000 population but no deaths due to influenza were recorded. Cholera accounted for 0.3 per cent. sickness and a mortality rate of 17 per 10,000 population.

The majority of the population was suffering from a fairly high degree of hæmoglobin deficiency. It was more marked amongst the females than amongst the males. Thus the hæmoglobin value was less than 50 per cent. in 1.6 per cent. less than 75 per cent. in 81.3 per cent. and less than 100 per cent. in 17.1 per cent. amongst males, the corresponding figures amongst the females being 2 per cent. 85.8 per cent. and 12.2 per cent. The period of greatest deficiency in hæmoglobin content of the blood amongst the females corresponded to the period of greatest reproductive activity *viz.*, 25 to 35 years.

Although a rough method of stool examination had been used the carrier rate of hookworm ova was about 44 per cent., being slightly higher amongst the males (46.4 per cent.) than amongst the females. *Ascaris* infection was present in 3.7 per cent. of the population, males 3.1 per cent., females 4.4 per cent. Other stool parasites were found in 1.2 per cent. of the population.

Morbidity rate decreased as the age advanced. Few babies escaped sickness during the year. The rates were as high as 96 per cent. including fatal cases, 86 per cent. including repeated illness and 82.5 per cent. excluding repeated illness. Infants suffered most during the first month of life and then between the age of 9 and 12 months and to a somewhat less extent between 6 and 9 months. The chief causes of sickness amongst infants in order of frequency were diarrhoeas and dysenteries, measles, malaria, bronchitis and seabies. On the other hand, deaths occurred mostly from prematurity, diarrhoeas and dysentery, marasmus, other fevers, malaria, asphyxia neonatorum and tetanus.

The history of sickness obtained for pre-school children shows a decline in morbidity rate year by year as the age advances. In this group malaria caused the greatest amount of illness followed by measles and diarrhoeas and dysenteries. Bronchitis, whooping cough and pneumonia were diseases of lesser importance. The chief causes of mortality amongst pre-school children were malaria, diarrhoeas and dysenteries, cholera and other fevers.

School age exhibited interesting features in that while the morbidity rate was still high (44 per cent. including fatal cases) the mortality rate was the

lowest (5 per mille). The chief causes of sickness were malaria, measles, diarrhoea and dysentery, typhoid and paratyphoid, influenza and pneumonia in order of frequency. The main causes of death were malaria and diarrhoea and dysentery.

The defects noticed amongst children attending school were mostly in regard to posture and light during reading and writing, undernourishment, pediculosis, diseased tonsils, enlarged glands and defective teeth.

The average duration of disabling illness was 50 days per sick person or 19.6 days per head of population not including fatal cases and 21 days when fatal cases were included. At this rate the total loss of man-days suffered by the entire Health Area population works out to be 1,316,700 of which 953,000 man-days were contributed by malaria alone. Per sick person the number of man-days of malaria fever was on an average 57.4. This varied from 46 for infant to 64 for school child. Corresponding figures per head of population were 15, 3 and 20. In the case of dysentery and diarrhoea the average loss of man-days lost per sick person was 41 and it varied from 16 for infants to 47 for pre-school children and adults. School child lost 41 man-days.

Contrasted with these two diseases, in influenza and measles person-days lost through sickness were but few, in the case of influenza the average loss of man-days per sick person being 9 for adults and 6 for school children. Average number of man-days lost per head of population was nominal. In measles also 8 person-days were lost, on an average, per sick person. There was but little variations at different age periods. Only one-third of a day per head of population was lost from this disease, the greatest loss occurring in the pre-school age which amounts to  $1\frac{1}{2}$  days only.

Pneumonia occupied an intermediate position, the average number of man-days lost per sick person being 36. Adults took long time to recover, the number of man-days lost per sick person being 45. The average loss suffered per head of population was, however, small being one-fifth of a day only.

The average duration of disabling illness increased with age till the school age period and then decreased. At school age there was a loss of 52 days per sick child or a whole working month per head of population. Adults, on the other hand, lost 51.5 days per sick person and 18.4 days per head of population excluding fatal cases or 19.5 days including fatal cases. As compared with American figures the loss of time per head of population through sickness was twice as much in Singur.

Prolonged illnesses were mainly referable to malaria, dysentery and diarrhoea. The significant point is that the rate of recovery was slow.

For each death that occurred 800 man-days were lost through sickness. Converted in terms of loss of time for one individual it meant 2 years 2 months. This does not take into account the time spent on nursing by the relatives. It should also be remembered that relatively the grown-ups suffer greater loss of time than do infants and young children because the latter succumb more rapidly to the disease or recover more quickly. However, the largest number of man-days lost per death was by school child. It amounted to 3,898 man-days or a loss of 10 years 8 months and 8 days in terms of one individual.

In this connection it is interesting to note that malaria apart from its importance as regards morbidity and mortality rates, was of the greatest significance as a cause for loss of time. On an average there were 2,590 person-days lost per death from malaria. There was a considerable variation for different age groups in this respect. In the case of school child it amounted to 8,865, for adult 2,847, for pre-school child 877 and for infant 274 man-days. For each death from dysentery and diarrhoea 460 man-days were lost. School child lost about 861 man-days or 2 years and 4½ months per individual while adult lost 1 year 7 months and 7 days. In the case of pre-school child the time lost was 338 days or 11 months 8 days. The number of days lost was least in the case of infants being 99 days only.

As contrasted with these two diseases, in pneumonia person-days lost per death were 111 for all age-groups and 222 person-days for adults only.

One or more disabilities were exhibited by 107 persons. Altogether these defects were met with 112 times, of which 70 were found in the males and 42 in the females, the rates being 2.1 and 1.4 per cent. respectively. The commonest disability noted was partial deafness and then in order of frequency they were loss of limb, partial blindness, complete blindness, deaf-mutism, kyphosis, complete deafness and hare-lips. These rates being of small magnitude are subject to large fluctuations due to sampling error (*see* Table CXCI).

By far the largest incidence of disabilities was amongst old people but no age-group was exempt. Most of the disabled persons were at home partly because many of them were old and partly because of the disabilities. It is of interest to note that of the 106 disabilities for which information was available over 74 per cent. were due to disease, over 13 per cent. were due to congenital causes and only 7 per cent. were accounted for by accidents.

It is a matter of considerable difficulty to evaluate the factors concerned in morbidity and mortality but an attempt has been made to correlate some important factors. Thus both the illness at the time of the survey and the incidence of disease during the preceding year exhibit a marked difference in the sex distribution. As has been pointed out, the incidence of acute illness amongst the males was twice as much as amongst the females. The rate of chronically ill also was higher amongst the males but the females complaining of indifferent health were slightly in excess of the males. We are unable to offer any satisfactory explanation of the sex difference noted here, except to mention the fact that the higher incidence amongst the males was mostly due to asthma, dysentery and diarrhoea, influenza, pneumonia, typhoid and paratyphoid fevers and measles. As a sequel to the higher morbidity rate amongst the males the mortality rate was also much higher amongst them, the respective rates for the males and the females being 29 and 18.

It is interesting to note that the literate and the few persons with higher education did not have any advantage over the illiterates in regard to the incidence of illness and death. But it cannot be concluded that education *per se* is responsible for higher incidence of sickness because the age and sex compositions of the literates and the illiterates are materially different, and the comparison is therefore not quite fair. However, amongst children of school-going age the incidence of illness was greater amongst those attending school than amongst those not attending school. This difference does not arise from economic reasons because the poorer children attend school less frequently than children from the better class families.

The numbers are small but there is a suggestion that person addicted to opium or alcohol suffer more frequently from acute and chronic illnesses than the abstainers. Apart from the question of age and sex differences in the two groups, it may be argued that sickly people tend to become addicts.

The population is mainly agricultural. No clear-cut conclusions can be drawn from a study of the occupational distribution of sickness because of complications arising out of peculiar age and sex distributions of the various groups.

Dysenteries and diarrhoeas are frequently met with amongst the widows. There is a vague suggestion that use of tank water for drinking purposes more often practised by them may be a contributory factor. The other differences connected with marital status cannot be dissociated from age and sex composition but considering the high incidence of indifferent health amongst the widowers one is tempted to think that married life gives a certain amount of safeguard as regards health.

One factor which seems to be clearly associated with acute and chronic sicknesses is the economic status. The poorer people suffer more frequently from such disease than those economically better off.

In the distribution of sickness by causes the wage earners had a certain amount of advantage in regard to sickness from all causes and specially from diarrhoea and dysentery, other fevers and measles. However, they suffered relatively more from asthma and influenzal pneumonia. It is interesting to note that 3.3 per cent. of the wage earners are unable to work at any particular moment due to acute or chronic illnesses and 7 per cent. cannot pull their full weight due to indifferent state of health. Thus due to acute or chronic sickness 235,740 man-days are annually lost by the population of the area, not to speak of the inefficiency caused by minor ailments. Sickness, therefore, is an important cause of poverty.

Without more complicated analysis which can only be satisfactorily carried out for larger samples, one cannot convincingly isolate many of the remote or less direct causal factors of sickness. We may, however, speculate with regard to some of them such as those involved in the environmental and socio-economic conditions.

The most important of these factors appears to be the nutritional condition. As we have seen, there is a widespread general malnutrition and also considerable clinical deficiency of iron and of vitamins A and C. The diet is poor in caloric value, in carbohydrates, in fats, in calcium and to a certain extent in vitamin A. Under the circumstances, a large number of people must necessarily exhibit low metabolic activity which, we know, is associated with lowered resistance to infectious diseases.

Speaking generally, the incidence of protection through artificial immunisation is meagre for most diseases except smallpox. We do not wish to be understood that we advocate indiscriminate mass immunisation campaigns as a *prima facie* for all diseases. Mass immunisation must be undertaken with clear understanding of the herd-structure and of the degree of resistance imparted by the specific immunisation.

As regards the environmental conditions it would serve no useful purpose to re-estimate the extremely favourable conditions for the transmission of

infectious diseases which are prevalent in this area and which have been discussed in details in Chapters II, V and VI.

The sub-tropical climate, the deltaic formation of the country, the existence of river, road and railway embankments interfering with the natural flooding and flushing, the poor inter-village communications, the high density of population (1,900 per sq. mile), the unsatisfactory construction of the houses, the small floor space, the low standard of general cleanliness, the dampness of the dwellings, the existence of the ubiquitous *doba*, the general lack of drainage, the primitive conditions with regard to the disposal of faecal matters and cattle-shed refuse, the presence of large breeding areas for flies and mosquitoes, the non-protection of food from flies and insects and the dirty water available for bathing and domestic purposes can hardly be expected to support a healthy population. To these may be added the low economic level and the unstable economic status of most families.

Illiteracy amongst the population is as high as 80 per cent. and education particularly amongst the females is still more backward.

The preventive and curative medical services are but poorly developed. There are 2 physicians per 10,000 population. In the sample population the number of expected mothers receiving pre-natal care per 100 confinements is 16.5, only 3 per cent. of deliveries take place in hospitals, post-natal care is received by 12 per cent. of women, 2 per cent. of infants visit clinics and 6 per cent. are visited at home, and 13 per cent. of school children receive individual health examinations. The number of hospital beds per 1,000 population is 0.22 and there are only 4 outdoor dispensaries. There is only a nominal infectious diseases service.

## II. Crystallisation of the main health problems of the community and determination of their relative importance and suggestions for investigation.

One of the objects of the present survey is to evolve a comprehensive scheme for general health survey for use in different parts of the country and as such the methodology presented here is subject to modifications according to the experience gained. Some ideas about the directions along which improvements may be effected have been formed and others may be usefully applied in future surveys. For instance, we now know that a larger area and a bigger sample would be required for carrying out more detailed analyses which would permit better isolation of factors concerned with the state of health. While the schedules are generally suitable for the purpose certain additions and alterations are indicated. Another important point that clearly emerged out of this investigation is that surveys should be preceded by a course of special training for the workers and that the field work should be conducted under the supervision of full time technical experts.

The mortality rate in this area is not high compared to the rest of the country, yet the morbidity rate presents serious problems. The present public institutions for medical relief provide rudimentary outdoor treatment to only 1/36 of the total sick although they could take care of double that number if they were sufficiently popular. The annual expenditure on these institutions amounts to 2½ annas per head against Rs. 2½ spent by the people themselves for medical relief. However, there is only one practitioner of scientific medicine in this area per 5,000 of population, and for every such practitioner there are four quacks. Whether or not the State ultimately



takes up the entire responsibility for medical relief, it is not possible to provide qualified medical personnel to treat all the sick people, in the near future, neither it is desirable to do so. The urgent need of preventive medicine is thus fully emphasised. This is further supported by the economic considerations. According to the present estimate 235,740 man-days are annually lost by wage earners through disabling illnesses, not counting the partial loss of output suffered on account of inefficiency caused by indifferent state of health. Taking average daily wage at a small sum of Rs. 0-8-0 per day the Singur Health Centre Area suffers an annual loss of at least Rs. 1,16,810. Adding a similar sum out of the money now spent on medical relief a fair amount of funds should be made available for preventive work. We may now consider some of the more important diseases individually.

It is evident that malaria takes precedence over all other direct causes of ill-health. Not only does it account for the major portion of morbidity and mortality but it is also responsible for the largest number of person-days lost through sickness. In fact, it accounts for 73 per cent. of such loss. Even after clinical recovery malaria infection persists for a long time and after-effects of the disease remain noticeable for considerable periods. Its geographical position, topography and physiography, the favourable climatic conditions with high relative humidity and temperature maintained for a considerable part of the year, the presence of innumerable permanent breeding places provided by tanks and *dobas*, collection of water surfaces in the low-lying lands and dead rivers caused by the blockage of natural drainage due to artificially erected river, road and railway embankments and the general state of mal-nutrition in the population, all contribute to the endemicity of malaria in the Area. The slow rate of recovery is mainly attributable to the last named factor, possibly supplemented by hookworm infestation.

The comparative rarity of *Aphilippinensis* which is believed to be the only carrier species of malaria in the locality, during the first half of the year when fresh cases are not uncommon, indicates the possibility of the existence of some other vector species such as *A. aconitus*, *A. varuna* or *A. annularis*. A closer search should be instituted.

To control this disease it is necessary to evolve a well-balanced scheme combining the biological and the environmental approach to the problem which may be practicable and suitable for the community. Such a scheme still remains to be devised.

Gastro-intestinal diseases including diarrhoeas and dysenteries and cholera are next in importance in causing sickness and loss of time. Unsatisfactory sanitary conditions including improper disposal of night-soil and cattle shed refuse, the presence of a large number of fly breeding grounds, the non-protection of food from flies, the lack of knowledge regarding modes of infection and the mediæval nature of family outlook are some of the more important factors concerned.

Investigations are required to follow the viability and virulence of the causal organisms through the environment and more particularly to study the role of 'doba' water as carrier of infection when used for domestic and bathing purposes.

Enteric group of fevers seems to be fairly common particularly amongst the school-age population. Improvement of general sanitary conditions,

dissemination of knowledge about the means of transmission of infection and about the importance of cleanliness, introduction of health education in schools, popularising prophylactic vaccination particularly amongst school children and creation of a proper outlook on health and disease will go a long way in controlling these fevers.

Amongst the local diseases of lesser importance mention may be made of measles, chicken pox, mumps, and tuberculosis. The first three cause much of the sickness seen amongst the younger age groups. The existing housing conditions preclude any possibility of effective isolation in case of infectious diseases particularly of the eruptive fevers. Apart from close personal contact of children in and outside the house, promiscuous defæcation and careless disposal of nasal and respiratory secretions and of wash water disseminate many types of infections amongst them. To these may be added other circumstances favourable for the spread of droplet infections such as, high density of population (1,900 per sq. mile), frequent communication with cities and industrial areas, poor state of socio-economic and sanitary conditions including over-crowding (the majority of houses permit only less than 36 sq. ft. per person), unsatisfactory ventilation inside the rooms and leaky roofs and damp floors.

Respiratory infections including measles, influenza and pneumonia constitute important causes of sickness. Preventive measures directed against them cannot be easily organised in this community and we must for the present rely mostly on medical relief.

Although smallpox is fairly under control a morbidity rate of 1.2 per mille will not be considered low against the provincial mortality rate of 0.1 per mille, particularly when part of this area had the benefit of the activities of an organised health unit for a period of five years previous to the commencement of the survey. A more intensive vaccination programme is, therefore, recommended.

Unidentified fevers grouped together as 'other fevers' contribute a morbidity rate of 13.6 per mille. It is a question whether and to what extent fevers of unknown origin are prevalent in this part of the country, or whether they are classed as such for want of facilities for diagnosis. It is also possible, on the other hand that some of the so-called malaria cases may properly belong to this group. Investigations on these lines are likely to prove fruitful both from theoretical and practical points of view.

Asthma also figures high up in the list of diseases. It is an incapacitating and troublesome disease. Its causes are many and varied. Investigation on the ætiological factors of asthma would be a useful line of work.

The incidence of tuberculosis is high for a rural area. Close contact with urban and industrial suburban areas is suggested as a probable explanation. The gross over-crowding in the living rooms and poor diet are the most important unfavourable conditions for this disease in the community.

Of the other morbid conditions which contribute towards a low level of health, mention should be made of the existence of a high rate of hookworm infection. Even with a crude method of diagnosis the carrier rate of hookworm ova was as high as 44 per cent. Investigations involving the use of more exact methods and estimation of the number of eggs per c. c. of fæces are indicated. Control of hookworm infection through improvement in the

disposal of night-soil accompanied by mass treatment will probably lower the incidence of the state of indifferent health, improve the blood picture and increase the working efficiency.

General malnutrition is fairly widespread irrespective of the local economic strata. Clinically nutritional deficiencies have been observed in respect of iron, vitamin A and to certain extent vitamins C and B<sub>2</sub> (riboflavin). A sample diet survey has also shown that deficiency exists in the total caloric intake, proteins, carbohydrates, fats, calcium and to a certain extent in vitamins A and C. The present war conditions and their repercussions on food supplies and general economic equilibrium may be partially responsible for this high rate of undernourishment. While no material change can be brought about in this respect without the improvement of economic conditions, it may not be difficult to remove a few of the deficiencies mentioned above. For instance, deficiency of vitamin A, iron and calcium can be removed without much additional financial implication by advocating more liberal use of leafy vegetable, roots and tubers and certain fruits, e.g., dates, guava, papaya, pineapple and mangoes which are locally grown. To meet the deficiency in animal proteins, cultivation of fish in *dobas* and tanks on scientific lines may be encouraged and poultry keeping may be popularised. Whatever little milk is produced is generally sold out or converted into *channa*. Its wider use particularly amongst children should be insisted upon.

The number of disabled person is not inconsiderable. As many as 107 of the 6,388 permanent residents of the sample population have been permanently lost to the community as efficient wage earners. Two-thirds of these disabilities were due to disease and 13 per cent. were congenital in origin. Thus a great deal can be done to reduce their incidence if proper preventive medical service can be organised.

Low haemoglobin content of the blood is a marked feature of this area. The females suffer more frequently and more seriously than the males. Anaemia is particularly noticeable amongst women of reproductive age period. For a fuller description of the type of anaemia prevalent here, a special investigation is indicated. Amongst the causes of this condition, mention may be made of malaria, malnutrition, hookworm infection and early pregnancy. It is however important to ascertain the relative contribution of these and other factors through a special investigation in order to suggest suitable preventive and control measures. There is, however, little doubt that anaemia is a serious condition undermining the health and efficiency of a large proportion of the population. It is of special significance in connection with maternal and infant mortality and morbidity.

Particular attention may be drawn to the exceptionally high morbidity rate amongst infants and to the loss of life during the first month of their existence. The main causes of neonatal deaths are prematurity, marasmus, asphyxia neonatorum and congenital malformation while the diseases most prevalent amongst the infants are diarrhoeas and dysenteries, measles, malaria, bronchitis and scabies. General malnutrition is common, particularly so amongst women of child-bearing age. It is reasonable to assume that anaemia amongst them is largely of nutritional origin. The extra burden imposed by gestation and lactation must have profound influence to the disadvantage of both the mother and the child. Animal experiments provide evidence to suggest that nutritional deficiency during pregnancy and nursing causes

considerable lowering of non-specific resistance of the progeny against infection. Thus, there is a strong suggestion that exceptionally high morbidity rate of infants and neonatal mortality may be associated with maternal malnutrition. Elucidation of this point is a matter of great practical importance and investigations along these lines have long been suggested by the senior author (R. B. L.).

Of the defects noted amongst school children malnutrition heads the list followed by unhealthy gums and teeth, diseased tonsils, anaemia, enlarged glands and caries. School health service needs considerable strengthening for purposes of complete medical examination, correction of defects, prevention of infectious diseases and health education if it is desired to build a healthier community in the future.

A curious point noted with regard to morbidity and mortality is a disproportionately higher incidence amongst the males. Since a large proportion of cases of infectious diseases are primary rather than secondary in the families, the suggestion is that infection is largely acquired by men during their daily contact with the urban and the suburban areas. What forces keep in check the local spread of these diseases need further elucidation.

The two most important problems of environmental sanitation are the proper disposal of night-soil and water supply. The position regarding the latter is not unsatisfactory, almost the entire population is now using tubewell water for drinking purposes. Reference has already been made to the desirability of conducting investigations on the role of 'doba' water in the dissemination of gastro-intestinal infections and to the part played by unsanitary methods of disposal of faecal matter and other refuse in the spread of these diseases. Much improvement may be expected from a simple device to protect food from flies in the kitchens. Housing reform must be included in long term programme.

Although the Health Centre Area is well connected with Calcutta and suburban areas by railway and roads the inter-village communications which are essential for the efficient working of the public health programmes are very poor and need early improvement.

Of the socio-economic problems related to health 'growth of population' has attracted the attention of many. In the Singur Health Centre Area the average size of the family is  $5.9 \pm 3.4$  and the sex ratio of male to female is 52 : 48. The average age at marriage for the females is 11.2 and for cohabit 12.7. The gross reproduction rate is 2.9 whereas the net reproduction rate is only 1.1, which means that there is an excessive waste of life between the birth of the girl baby and her reaching maturity, resulting in only a moderate growth of population. The factors that contribute towards the high gross reproduction rate in the area are early and universal marriage of the females and high birth rate (42.6) whereas the counteracting forces which reduce the above effect are high mortality rate in early life and the existence of a large number of widows who are prohibited from remarrying by social customs. Without going into a detailed discussion which require a separate treatment it may be suggested that by postponement of marriage to a later age considerable reduction in population growth may be effected. Social forces are working towards this reform and it may be safely concluded that growth of population is not likely to present a serious problem in this area.

Illiteracy is one of the stumbling blocks in the progress of any nation-building work particularly public health. As much as 57.5 per cent. of the male population and 95.5 per cent. of the female population over 10 years are illiterate. Thus there is only 1 literate female for 9 literate males. Relationship between illiteracy and ill-health has not been established in this study but detailed analyses have not been carried out. Determined attempts should be made to advance education. Adult education including health education should be as much emphasised as primary education.

The economic level of the people is generally low and that too is mostly unstable. The survey has shown that in certain matters such as the incidence of acute and chronic diseases even the limited amount of relative prosperity enjoyed by certain families gives them small but a clear advantage.

In general, the economic conditions impose restrictions which prevent effective use of modern means of preventing disease and building better health. For instance, 90 per cent. of the family budget on the consumption side is spent on food and even this is deficient. The rest is taken up by other necessities such as fuel and light, taxes, interest on loans, medical relief, etc., and little is left for effecting any improvement. Economic advancement is an all-India problem which must be solved before material progress in matters of health can be made.

According to our preliminary studies in 'function' it would appear that the outlook of the people in regard to food and causes and control of infectious diseases is still largely mediæval. Generally speaking, their attitude is more individualistic than sociological. Since the evolution of health practices in a democratic society largely depends upon how people think and how they react to outside suggestions, these should be important considerations in the planning of public health policy. It may be wiser in the beginning to lay greater emphasis on programmes which would give immediate demonstrable relief to individuals in matters that worry them most rather than on those designed to produce far-reaching but less obvious results, whatever their scientific justification may be from purely biological point of view. They should include building of positive health. Such programmes are likely to appeal to the majority of the people and elicit proper reforms. As more and more success is achieved in arousing the people from morbid inactivity they should be further educated to the ideas of self-help and to the need of co-operative community efforts without which preventive medicine cannot succeed and individual efforts are largely wasted. Success with such a policy would mainly depend upon selection and training of personnel, upon continuous, intensive research in both the biological and sociological fields and upon the provision of such facilities and technical supervision as the existing state of the 'social organism' demands. In contrast to the policy outlined above, one frequently meets with clear-cut and rigid schemes conceived according to author's ideas of scientific requirements or experience and perhaps patterned after a successful foreign plan. However rational such plans may look on paper, their success may be endangered by the fact that they are out of tune with the 'social organism'.

**III. The establishment of bases for assessing the extent of progress achieved by the application of specific health measures.**

Ordinarily the state of health of any particular locality is judged mainly on the following records, *viz.*, the 'chowkidars' return of births and deaths,

and hospital figures and decennial census records. Of these, the main pivot is the 'chowkidars' return which, it is well known, is anything but satisfactory. This has been shown by our survey results for which the reader may refer to Chapter XI. The present survey provides us with the necessary bases upon which the results of the activities of the reorganised Singur Health Centre can be assessed in future by repeating similar or modified surveys.

One point, however, which needs mention here, is that the period of survey unfortunately coincided with a time of unusual stress and strain to which the Province has been recently exposed. When these are removed there will be an automatic trend towards partial or complete recovery of the general health conditions irrespective of specific health measures practised. Besides, the Singur Health Centre has the benefit of expert technical advice and supervision both official and unofficial encouragement and additional financial assistance from various funds, which will not be available in other places where similar measures may be instituted. These facts should be borne in mind, while viewing the present picture of community health and in assessing the progress likely to be made through the application of certain specific health measures.

The Health Indices of the community as worked out from the survey records have been given in Chapter III in accordance with the International System recommended by Stouman and Falk. It is strongly emphasised that in all future surveys the records should be maintained and presented in a manner which will permit comparison between surveys carried out here and in any other part of the world. For this purpose, we recommend that Stouman and Falk's Health Indices should be our principal guide. This principle should also be borne in mind while carrying out special periodical surveys by Maternity and Child Welfare Section, School Medical Service or other specialised groups.

## CHAPTER XIV.

## GENERAL REMARKS.

The study presented here touches upon a variety of subjects each of which deserves a fuller consideration. Our object has been rather to integrate different aspects or factors relating to health problems than to dive deep into any of them. Thus we have only skimmed on the surface. One of the handicaps from which we have suffered is the small size of the sample which does not permit detailed analysis and cross correlations. However, we are encouraged by the belief that as a first study of its kind it has achieved the objects of the survey fairly satisfactorily.

The survey relates to a circumscribed local area and most of the conclusions arrived at are applicable to the community under investigation. However, we venture to suggest that some of the results of the survey may be viewed as of wider significance. In the first place, this study may claim to have developed certain techniques for the collection and analysis of field data applicable to the rural areas in this country which may by repeated application improve through refinements and better adaptation to local conditions. In the second place, the results obtained suggest that similar surveys should form an integral part of public health programme. State Medicine essentially means the application of scientific biological knowledge to a community suited to its peculiar socio-economic and environmental set up and to its political pattern. This is only possible when we are fully equipped with the knowledge of factual conditions prevailing in the community. If that be so, we must look upon the community as an 'organism' which needs special techniques for the study of its anatomy (structure), physiology (function) and pathology (the unhealthy state) and the State Medicine must evolve itself from a consideration of these various aspects of the 'organism'.

It may thus be recognized that State Medicine in its present evolutionary stage corresponds with the Clinical Medicine of the pre-renaissance period. With some people it has been an article of faith that there is a great lag between our biological knowledge and its application for the benefit of social order. Be that as it may, there is an evidence of impatience in certain quarters, for removal of this lag. They believe public health as more of an art than science, and ignore the reasons why this lag has persisted. There is no short-cut to scientific progress but it is rather strange that in this age of science there should be so many people who believe in bypassing the long and arduous scientific method as applied to the problems of public health. The present study may be looked upon as an attempt at applying the scientific method to the study of the structure of a community from the public health point of view. The study of function should follow suit.

In conclusion it may be stated that social welfare is indivisible. We have briefly touched upon some aspects of social structure other than those directly pertaining to public health. These studies are necessarily superficial and technically amateurish. The ideal approach to the problem of social structure would be through a general survey conducted under the guidance of a committee of experts in education, agriculture, animal husbandry, cooperation, industry, economics and other allied fields. Following such surveys comprehensive correlated or if possible integrated schemes may be evolved in

which contributions of the various departments may be more or less emphasised' according to the stage of development of the social organism. 'It may be found' advantageous to contact the rural population through a unitary polyvalent agency having a multiple technical backing. Such a machinery may prove not only cheaper and more efficient but more acceptable to the village communities. They may soon learn to repose confidence in a man who understands them and their requirements and who can help them in satisfying their varied needs by securing the services of appropriate technical personnel. At present the villager often feels bewildered by the one sided propaganda which is carried out by the technical officers of various departments, imbued with unbalanced enthusiasm for their own specialised fields. A unified contact will remove this wasteful effort. Specialists will be able to make more fruitful contact with rural population, giving better and more effective service and acquiring clearer and more realistic knowledge in their respective fields.

#### ACKNOWLEDGMENTS.

The senior author first conceived the idea of evolving the technique of an integrated (general) health survey, mainly for practical training of D. P. H. students. Over seven years ago he invited Heads of all Sections of the Institute to contribute their quota towards it on account of their special knowledge and experience. He is glad to acknowledge the valuable help and guidance which has received from them and from his colleagues in the Section of Epidemiology and Vital Statistics of the Institute throughout this period of seven years. It is not intended to individually mention the names of persons to whom our thanks are due for the list is long, but we would like to mention specially our colleagues Drs. K. V. Krishnan, P. Bose and N. Mullick for laboratory work and Dr. C. Chandrasekar for statistical assistance in sampling. The principle of dividing the family expenditure into two classes—consumption side and production side, we owe to Mr. S. P. Agarwal and we acknowledge his assistance in solving one of our most difficult problems. We are also indebted to Dr. G. Sankaran, Dr. (Mrs.) L. S. Ghosh, Mr. K. Subrahmanyam and others for help in the preparation of schedules. Our best thanks are due to Mr. K. K. Mathen for his labours in supervising the statistical analysis and assistance in the preparation of the report. We are also thankful to our statistical assistants for their work in connection with analysis of the material. We have used some of the records of the Singur Health Centre for which we are thankful to Dr. B. Ghosh and Dr. T. R. Bhaskaran.

Lastly we desire to thank Dr. J. B. Grant for giving us an opportunity to carry out the survey.

It is, however, proposed to deal with certain special problems in greater detail, in a series of communications. The first article of this series on the 'Population Problem' will be found in the April 1946 number of the Indian Medical Gazette.

In another communication entitled 'Philosophy of Public Health' (*vide*, Science and Culture, Vol. XI, pp. 489-500, 1945-46). The senior author has utilised some of the more important findings derived from the survey data to support his plea for the employment of scientific method for the solution of community health problems as also of other community problems, and has attempted a scheme of integrated welfare organisation based on objective study.

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## APPENDIX 'I'.

Singur Health Re-organization Scheme (pp. 201—206).

## SINGUR HEALTH UNIT.

The Singur Health Unit provides the All-India Institute of Hygiene and Public Health with a controlled rural community field for investigation and for teaching of public health analogous in function to the provision to pre-clinical sections of a medical college of their own laboratories and to clinical sections of their own teaching hospitals. In addition it provides opportunity to investigate the best ways of applying the results of medical knowledge to the requirements of rural units of population within existing economic practicability. The Unit administratively is a cooperative activity (December 23, 1943) between the Government of India and Government of Bengal. The two purposes are: (1) to determine and demonstrate methods of public health administration which can bring essential medical protection to the rural population within the level of expenditure that the country can afford at its present stage of economic development; and (2) to afford participative opportunity for training medical and public health personnel, particularly the D.P.H. students of the Institute. An important feature of the scheme is the coordination of curative and preventive functions under a single administration in order to achieve the maximum results.

The Unit eventually will consist of the Serampore Sub-division, Hoogly District, with a population of approximately 500,000. Initially, the 4 Union Boards of Singur, Balarambati, Bora and Bogampur have been taken with a total area and population of 32.98 sq. miles and 62,736 respectively. These 4 Union Boards are organised as 2 special Units (see diagram on page 204).

The administration is under a Technical Advisory Committee designated to advise Governments of India and of Bengal on all major lines of policy and responsible for recruiting both the gazetted and non-gazetted staff. This Committee recommends an officer of the Institute to Government of Bengal as Officer-in-Charge of Administration, in which capacity he deputises the administrative control vesting in the Director of Public Health. Staff deputed either by Government of Bengal or Government of India are subject to the administrative control of the Officer-in-Charge of Administration under the guidance and supervision of the Professor of Public Health Administration of the Institute.

As regards other legal powers, the Chairman of the Hoogly District Board has delegated his powers to the staff engaged in the Unit according to the Local Self-Government Act, 1885 and the rules thereunder, Bengal Vaccination Act, 1880, and Food Adulteration Act, 1919. Where power cannot be delegated, the Chairman is approached for orders for prosecution. The Health Officer-in-Charge of Administration has the status of Honorary Health Officer of the Board. Similarly the Union Board deem the health staff working within their area as their honorary staff and delegate the necessary powers to them as permitted by the Village Self-Government Act, 1919, and rules made thereunder.

Policy, in the first instance was determined by two factors: (1) Government of Bengal in 1940 approved a "Scheme for Reorganisation of Rural Public Health Services in Seven Subdivisions" drawn up by Lt.-Col. A. C. Chatterji, Director of Public Health, Bengal. Government of Bengal desired that the Singur organisation should be based upon Col. Chatterji's scheme subject to revision as experience might indicate. (2) The *per capita* expenditure of 4 annas was accepted as the sum economically practicable in Bengal for combined medical and public health administration. It is obviously impossible to introduce any comprehensive level of technical efficiency with this limited sum. In fact, unless much of the Medical Protection can be provided through self-help under supervision it would be futile to inaugurate Singur. Consequently, cash purchase of medical protection is limited to (a) technical supervision of self-help, (b) essential but limited technical services. This principle of economic practicability is diagrammatically illustrated in the accompanying outline of relative position of cash purchase and self-help in a school medical service. One will note that such school health routine measures, as may be carried out, are chiefly those which either teachers or pupils can undertake themselves. Theoretical academic viewpoint may feel that it would be preferable not to inaugurate activities, if, as in the example of school health, they must be chiefly of the self-help level. Practicable public health policy in India must disagree with this academic viewpoint.

What is the  
Singur  
health unit?

Administration.

Policy and  
Scope of  
activities.

It must be remembered that it is better to make a start at a 30 per cent. level of accomplishment well done than to aim at 70 or 80 per cent. accomplishment and fall short. The unprovided 70 per cent. can gradually be added to the 30 per cent. Other factors determining initial policy are as follows:

(3) The primary administrative objectives are directed towards what empirically are considered to be the chief causes of *readily controllable* excess mortality. Smallpox is an example par excellence. On the other hand Tuberculosis may be found rampant but at this stage must be left out of consideration. These primary objectives are: (a) Smallpox immunisation and other epidemic control. It is hoped that once the machinery for smallpox is reorganised it may effectively carry routine immunisation against other diseases; (b) Environmental emphasis on water supply and excreta disposal; (c) An initial emphasis of maternity and child upon safe delivery; and (d) medical relief within the compass of the small budget available is to be directed towards amelioration of the chief causes of morbidity which are of acute nature. Some statistical yard-stick of results is essential and consequently vital statistics is an additional primary objective directed towards evaluating accomplishment in the three specific fields of attack *plus* registration of total births and total deaths. Control of epidemics may necessitate a temporary suspension of certain routines in order to concentrate upon the epidemic in question, as for instance cholera, when an immediate intensive vaccination programme is introduced in addition to other environmental measures.

The chief secondary objective is a minimum school health programme.

The available special Government funds for grant-in-aid in malaria, maternity and child welfare and water supply make it possible to have secondary administrative objectives in those three fields that could not be considered on the annas 4 *per capita* basis. Government of Bengal make available a sum of Rs. 8,600 for a malaria control unit. Singur is availing itself of Government of Bengal's special financial provision for *dai* training to the extent of Approx. Rs. 1,500. On the principle that initial provision of safe water supply is a capital charge, a sum of Rs. 18,500 was provided by the Government of Bengal for 1944-45 to sink tube-wells to provide one well for approximately 40 households and Rs. 2,500 for the sinking of bore-hole latrines. During 1945 certain specific projects connected with the Health Unit are being supported by the Rockefeller Foundation as follows: Rural Water Standards and Correlated Epidemiological Study Rs. 19,000; School Health Programme and a Training Programme to train village volunteers and local *daies* (midwives) Rs. 19,000; and Nutrition Survey Rs. 14,000.

It is presumed that successful attainment of primary and secondary administrative objectives will reduce markedly the morbidity of the areas.

(4) Economic practicability is stated as the first principle for adherence. Six other principles guiding administration are: (a) the interdependence of social services and the consequent urgency of interesting Bengal Departments of, particularly, Agriculture, Education and Co-operatives in the Serampore Sub-division, Hooghly District. (b) This applies particularly to education, because of the principle that the maintenance of health depends upon the people themselves possessing adequate health education and knowledge. (c) The administration of special functions being undertaken only by a single governing body. Public health may prime the pump in health education but this function in the schools belongs to education. (d) Realisation of the necessity for compromise in social progress (hence the above 30 per cent. objective), but provided compromise is in terms of the eventual whole design. (e) Administrative procedure must be scientifically derived. This is the real responsibility of the Institute and does not come within the annas 4 *per capita*. (f) Successful extension of administrative methods developed in Singur will depend upon the two factors of their being extended by personnel already trained in the Singur administrative methods which have been successfully tested.

The Institute Section of Public Health Administration is responsible for the overall administration of the area. In addition, it is itself responsible for the administration of the primary objectives of smallpox immunisation; epidemic control; and vital statistics; as well as for the secondary objective of school health. The section collaborates with the section of Public Health Engineering in malaria. The latter section is responsible for sanitation of environment, particularly water and the major share of malaria. The Section of Maternity and Child Welfare is responsible for the primary objective of maternity and child Welfare.

The responsibility of non-operating sections of the Institute has been indicated above in that they contribute to the derivation of scientific administrative procedure. Ordinarily, in the first instance, the sub-divisional unit of the Bengal Reorganisation Scheme would be unable to afford a diagnostic laboratory. The availability of such a laboratory contributes materially to the checking of much data which otherwise may only be assumed. Expense of procuring such data as otherwise might not be available is considered a legitimate charge against the responsibility of the Institute's Section of Microbiology. Similarly the statistical machinery established within the limits of a four annas *per capita* budget is checked by the Section of Vital Statistics, and, again, the field expense in connection with such checking is a legitimate charge against the Institute's section in question. ETC.

### ORGANIZATION.

The primary objective of Organisation is to develop self-help agencies. As already stated the limited technical personnel within the available budget cannot themselves provide any significant degree of medical protection. The following local groups are the channels through which self-help is developed.

(a) A Unit Public Health Advisory Committee.

(b) A Union Health Committee.

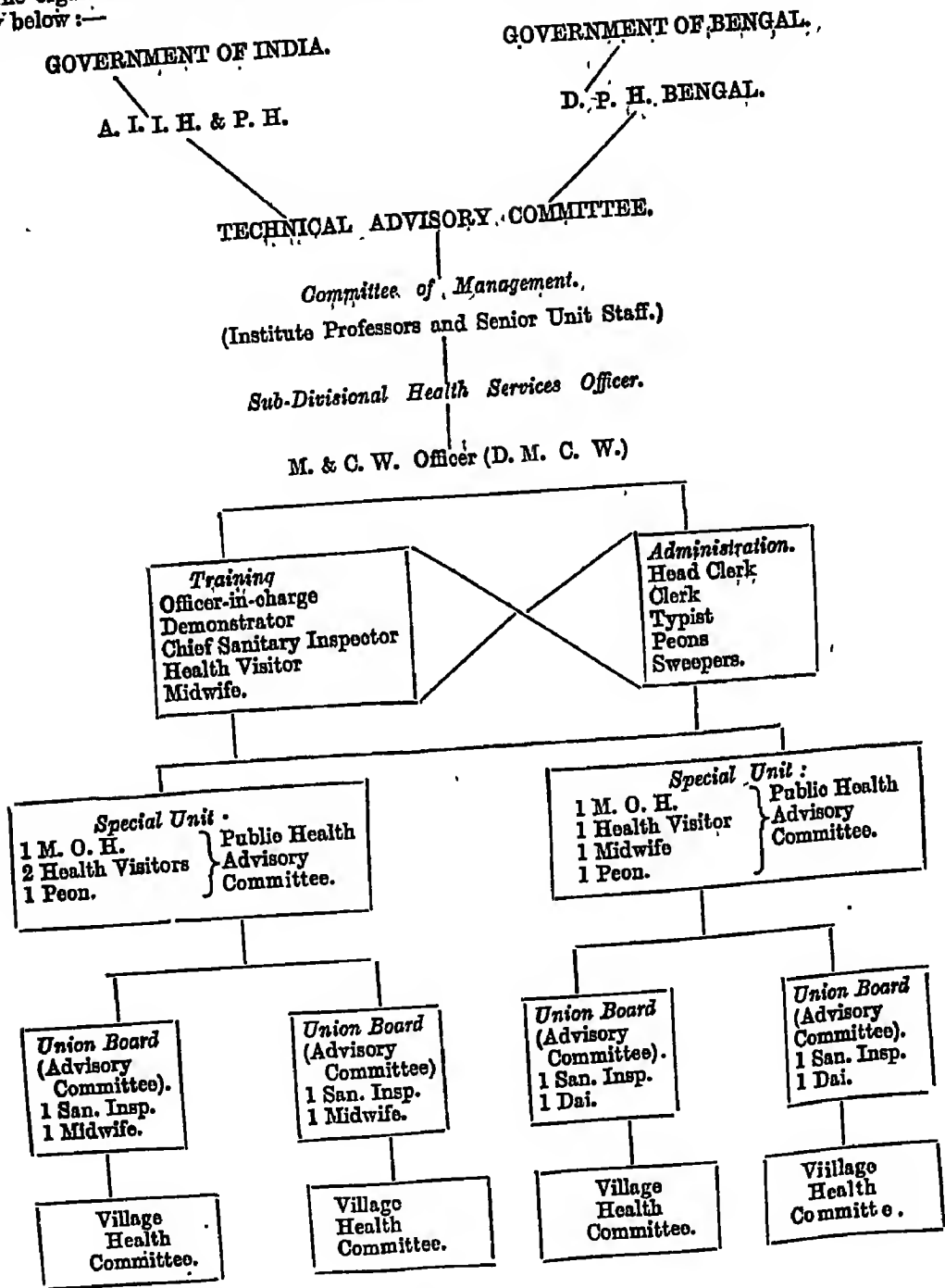
(c) Village Health Committees—one for each village or units of approximately 200 families.

These committees, particularly (c), are not brought into existence until there is assurance that they will function in the desired manner. This implies that in each instance the M. O. H. has educated the anticipated members as to the committee's purpose and responsibilities.

*Functions.*—Each of the five members of the village health committees is responsible under the supervision of the M. O. H. or his deputy, for one of the five routine health activities undertaken in the village: vital statistics; epidemic control and smallpox vaccination; environmental sanitation; maternity and child welfare; and, malaria control when carried out. Where required committee members and also as in the case for malaria control, village volunteers are given special training for the discharge of the responsibility in question. Each category of health committee holds meetings routinely attended by an officer of the Unit.

The functions of the other Committees are, in the first instance, along the lines outlined in Appendices VIII and IX of the Reorganisation of Rural Public Health Services Scheme. (Bengal Government Press, Alipore, Bengal, 1941).

The organisation of the administration and the personnel is presented diagrammatically below :—



#### Explanatory Notes :

Three features of the above diagram must not be lost sight of. First that at the top is a combination of Training and Supervisory offices as envisaged for the whole Sub-division. Second that the scheme incorporates maternity and child welfare not provided in the Chatterjee's scheme. Third that the personnel listed are purposely of a higher category than in Chatterjee's scheme, because of the experimental nature of the "special unit". Similarly, the Sanitary Inspector in the Union Boards below is a health assistant in Chatterjee's scheme, while the midwife is a dai.

(1) The duties of the Sub-divisional Health Services Officer are in general as outlined in Appendix I (items 1 to 11 and 13, 20, 21, 22, 24 and 25) of the Scheme for Reorganisation of Rural Public Health Services in Seven Sub-divisions except that for the temporary purposes of the Singur Unit the D. M. O. is substituted by the Technical Advisory Committee. Also, in view of the technical services available through the Institute items of duty are deputed to the resident officers of the several sections as follows:

*Public Health Engineering Section*.—Items 12, 14, 15, 16, 19 and 23 of Appendix I of the Scheme for Reorganisation of Rural Public Health Services in Seven Sub-divisions.

(2) The general duties of the Rural Medical Officer of Health are defined in Appendix I (item 18) and Appendix II (items 1 to 3) of the Scheme for Reorganisation of Rural Public Health Services in Seven Sub-divisions. His specific duties are of two categories: (i) curative and (ii) preventive.

(i) *Curative*.—Two things must be realised—(1) the average population of a unit is 20,000. The lowest morbidity estimate of 10 per cent. means that 2,000 individuals in the area will be sick daily. This is obviously beyond the capacity of one medical officer to cope with. Fortunately, most of this morbidity is preventable provided the required measures are undertaken. To preclude the M. O. H.'s inundation with curative to the detriment of the more important preventive activities requires that there should be rigid demarcation between the hours assigned for curative and preventive responsibilities which cannot be infringed upon except under a real emergency. Consequently, the M. O. H.'s morning attendance at the centre and sub-centre dispensaries shall not exceed 4 hours a day regardless of the number of patients. No domiciliary visits shall be undertaken. Private practice is disallowed. (2) The M. O. H.'s general administrative duties shall be as defined under items 4 and 6 of Appendix II of the Scheme for Reorganisation of Rural Public Health Services in Seven Sub-divisions. The Civil Surgeon will be his supervisor with respect to curative problems.

(ii) *Preventive*.—The chief instrument for success of preventive activities is the Union and Village health committees. The health officer succeeds or fails to the degree that he implants himself through these local agencies. Consequently his chief responsibility is to develop successful village committees through whom the staff will undertake the primary and secondary administrative objectives defined above. In so far as possible the technical personnel constitute themselves as the technical supervisors of the activities undertaken through these committees except as the technical nature of the problem requires the public health personnel themselves to undertake the measures in question.

The M. O. H. or his substitute visits routinely per schedule each village within his area for consultation with the committee and supervision of the activities of that village. These primary and secondary activities consist of vital statistics, small-pox immunisation, environmental sanitation, midwifery service, malaria control and school health together with emergency epidemic control when required. The specific routines of these activities are outlined in manual form.

(iii) The additional general duties of the M. O. H. and his office are as outlined in items 14, 16, 17, 18, 19, 24, 25, 28, 30 and 31 of the Appendix II of the Scheme for Reorganisation of Rural Public Health Services in Seven Sub-divisions. In addition he shall be responsible for the supervision within his area or any publicly supported dispensary or hospital.

## SELF-HELP IN SCHOOL HEALTH.

Table illustrating the extent to which School Health can be undertaken through local self-participation.

Item.	Initial.		Routines.	
	Medical Officer.*	Self-participation.	Medical Officer.*	Self-participation.
I.—Sanitation—				
1. Water . . . . .	†	††		††
2. Sewage . . . . .	††	††		††
3. Cleanliness . . . . .		††		††
II.—Medical Service—				
1. Examinations . . . . .	††	†	†	†
2. Correction of defects—				
(a) Acute . . . . .	††			††
(b) Chronic . . . . .	††		††	
3. Preventive measures—				
(a) Vaccination-Inoculation . . . . .	††	†	†	††
(b) Personal Hygiene . . . . .		††		††
III.—Health Education . . . . .	†	††		††

NOTE.—Single† indicates minor responsibility for execution while †† indicates major responsibility for execution.

\* Apart from routine inspection-supervision.

Finance.—The administrative expenditure for this Health Unit with a population of nearly 63,000 is in the neighbourhood of Rs. 32,000, or a *per capita* expenditure of As. 0-8-0 per annum. However, inclusion of the cost of training and also the financial aspects of the Institute's collaboration in the Health Unit raises the total to nearly Rs. 1,00,000 or a *per capita* expenditure of Rs. 1-8-0 per annum, a figure which may be considered well above what the provincial government can afford, under existing conditions, for the development of local health organisations. Two things should be borne in mind, however. First, this cost includes the overhead of personnel and expenses of the future Sub-divisional office. Also the category of personnel employed in these two initial special units is of a much higher level and consequently more expensive than personnel who would be employed when the organisation and administration is extended throughout the Sub-division.

## APPENDIX 'II'—Schedules (pp. 207—246).

1. General Individual Schedule.
2. General Individual Schedule (Absentees).
3. Nutritional Assessment Card.
4. Addendum concerning married women.
5. Addendum for pregnant women.
6. Addendum concerning infants.
7. Addendum concerning pre-school child.
8. Addendum for school child.
9. Patient's Schedule.
10. Home Visiting Schedule in connection with cases of infectious diseases.
11. Family Schedule.
12. Economic Survey Schedule.
13. Food Account.
14. Sanitary Assessment of House.
15. Collection of adult Anophelines.
16. Report on the collection of Larvæ.
17. School Survey Schedule.
18. Schedule for the sanitary survey of villages.
19. Report and Programme Form.

ALL-INDIA INSTITUTE OF HYGIENE & PUBLIC HEALTH, CALCUTTA.

**FIRST SURVEY OF SINGUR HEALTH CENTRE.**

**General Individual Schedule.**

Investigator's Name & No.	Date.	(1) 2-3 Week of Survey.	4. Union Board.				Singur. 1 Baharimbati. 2 Dora. 3 Begumpur. 4		5-6 village (Name and Code No.)			
(2) 7-9. Family No.	(3) 10-14 Serial No.	Name.	Group I. 3	Group III. 4	Group V. 5							
15. Sex . . .	Male. 1	Female. 2	Residential Status.									
(4) 16. Length of Stay (year)	-1m 1	-2m 2	-3m 3	-4m 4	-5m 5	-6m 6	-7m 7	-8m 8	-9m 9	-10m 10	-11m 11	-12m 12
(5) 17. Age in years (in group),	-5 1	-10 2	-15 3	-20 4	-25 5	-30 6	-35 7	-40 8	-45 9	-50 10	-55 11	-55 & over. 12
(6) 18. Individual Year . . .	-1 1	-2 2	-3 3	-4 4	-5 5							
(9) 19. Part of year . . .	-1 week. 1	-1m 2	-2m 3	-3m 4	-4m 5	-5m 6	-6m 7	-7m 8	-8m 9	-9m 10	-10m 11	-11m 12
20. Marital status . . .	Unmarried. 1	Married. 2	Widow. 3	Widower. 4								
(7) Addiction . . .	Nil 5	Smoking. 6	Alcohol. 7	Opium. 8	Charas. 9	Bhang. 10	Others (Specify). 11					
(8) 21. Occupation . . .	Liberal profession. 1	Landlord. 2	At School. 3	At Home. 4	Shopkeeper. 5	Artisan. 6	Cultivator. 7	Transport labour. 8	Industrial labour. 9	Other labour. 10		
(9) 22. Nature of work . . .	Light. 1	Moderate. 2	Hard. 3	Very Hard. 4								





(5)

34. Position in the family.	Primary. 1	Secondary. 2	Diagnose 4	Supervisory 5	Terminal. 6	Actual No. of days up to 28 days.	—5wk. 20	—6wk. 30	—7wk. 31	—8wk. 32	—9m. 33	—4m. 34	—5m. 35	—6m. 36	6m. & over. 37					
Visits paid (notifiable diseases only).	Nil 3																			
Third disease . . .	12																			
Name of disease & Code Number.																				
Period of Sickness	Primary 1	Secondary. 2																		
Position in the family	Nil 3	Diagnostic. 4	Supervisory. 5	Terminal. 6																
Visits paid (notifiable diseases only).	Nil 3																			
35. Contact with infectious diseases.	Nil. 1	Cholera. 2	Small-pox. 3	Chicken-pox. 4	Measles. 5	Mumps. 6	Whooping cough. 7	Diphtheria. 8	Typhoid. 9	Taberculosis of the respiratory system. 10										
Degree of contact (19)	Close. 11	Distant. 12																		
36. Artificial Immunisation.	Nil 1	Small-Pox Vaccen. 2	Small-Pox Revaccen. 3	Typhoid. 4	Cholera. 5	Plague. 6	Rabies. 7	Others (specify). 8												
When Immunised	Within 6 months. 9	Partially deaf. 10	Completely deaf. 11	Deaf mute. 12	Over 2 years. 13	Partially blind. 14	Completely blind. 15	Loss of limb (including paralysis and paresis). 16												
37. Disabilities . . .	Nil 1	Congenital 8	Accident. 9	Disease 10																
Cause . . .	15-0— 1	17-5— 2	20-0— 3	22-5— 4	25-0— 5	27-5— 6	30-0— 7	32-5— 8	35-0— 9	37-5— 10	40-0— 11	42-5— 12	45-0— 13	47-5— 14	50-0— 15	52-5— 16	55-0— 17			
38. Height in inches (Groups).	57-5— 18 5	60-0— 19 1	62-5— 20 2	65-0— 21 3	67-5— 22 4	70-0— 23 5	72-5— 24 6	75-0— 25 7	77-5— 26 8	80-0— 27 9	82-5— 28 10	85-0— 29 11	87-5— 30 12	90-0— 31 13	92-5— 32 14	95-0— 33 15	97-5— 34 16			
39. Sub-Division	0— 1	5— 2	10— 3	15— 4	20— 5	25— 6	30— 7	35— 8	40— 9	45— 10	50— 11	55— 12	60— 13	65— 14	70— 15	75— 16	80— 17	85— 18	90— 19	95— 20
40. Weight in lbs. (Groups).	10— 21	11— 22	12— 23	13— 24	14— 25	15— 26	16— 27	17— 28	18— 29	19— 30	20— 31	21— 32	22— 33	23— 34	24— 35	25— 36	26— 37	27— 38	28— 39	29— 40
41. Sub-Division	0— 1	1— 2	2— 3	3— 4	4— 5	5— 6	6— 7	7— 8	8— 9	9— 10	10— 11	11— 12	12— 13	13— 14	14— 15	15— 16	16— 17	17— 18	18— 19	19— 20





**ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.**  
**FIRST SURVEY OF SINGUR HEALTH CENTRE.**  
*General Individual Schedule (Absentees).*

Singur.  
<sup>1</sup>  
 Balarambatl.  
<sup>2</sup>  
 Bora.  
<sup>3</sup>  
 Begumpur.  
<sup>4</sup>

5-8. Village Name and Code No.

2-3. Week of Survey.  
 4. Union Board.

1. Investigator's Name.  
 Date.

7-14. Serial No.  
 Male. Female.  
 15. Age . . . . .

16. Length of stay in the village (year).  
 17. Age in years (in groups).  
 18. In littoral year . . . . .

19. Part of year . . . . .  
 20-21. Name of disease and Code Number.  
 22-23. Period of sickness.

24. Position in the family.  
 25-26. Name of disease and Code Number.  
 27-28. Period of sickness.

29-30. Name of disease and Code Number.  
 31-32. Period of sickness.

33-34. Name of disease and Code Number.  
 35-36. Period of sickness.

37-38. Name of disease and Code Number.  
 39-40. Period of sickness.

41-42. Name of disease and Code Number.  
 43-44. Period of sickness.

45-46. Name of disease and Code Number.  
 47-48. Period of sickness.

49-50. Name of disease and Code Number.  
 51-52. Period of sickness.

53-54. Name of disease and Code Number.  
 55-56. Period of sickness.

57-58. Name of disease and Code Number.  
 59-60. Period of sickness.

61-62. Name of disease and Code Number.  
 63-64. Period of sickness.

65-66. Name of disease and Code Number.  
 67-68. Period of sickness.

69-70. Name of disease and Code Number.  
 71-72. Period of sickness.



## ALL-INDIA INSTITUTE OF HYGIENE &amp; PUBLIC HEALTH, CALCUTTA.

## FIRST SURVEY OF SINGUR HEALTH CENTRE.

## Nutritional Assessment Card.

		Date of Assessment					
		Serial Nos.					
Eye	Conjunctiva	Moist or dry (A)					
		Discolouration (A)					
		Discharge (A).					
	Cornea	Moist or dry (A)					
		Vascularisation (B <sub>1</sub> )					
	Angle of eyes	Excoriation (B <sub>2</sub> )					
Functional defects	Night Blindness (A)						
	Photophobia (A & B <sub>2</sub> )						
Nose	Mucous membrane	Moist or dry (A)					
		Discharge (A).					
Mouth	Lips	Condition (B <sub>1</sub> )					
	Tongue	Size (D <sub>1</sub> )					
		Colour (B <sub>2</sub> C)					
		Surface (B <sub>2</sub> C)					
		Edge					
	Gum and mucous membrane.	Taste (D <sub>1</sub> )					
Condition (C)							
		Condition (D).					
		Teeth	Time of dentition (D)				
Throat	Tonsils	Condition (A)					
	Adenoids	Presence (A)					
	Voice	Timbre (A)					
Ear		Discharge (A)					
Hair		Quantity (A)					
		Appearance (A)					
		Quality (A)					
Skin		General Appearance (A)					
		Elasticity (A)					
		On face (A & B <sub>1</sub> )					
		On upper limb (A & B <sub>1</sub> )					
		On lower limb (A & B <sub>1</sub> )					
Adipose Tissue		On trunk (A & B <sub>1</sub> )					
		Quantity (A)					
		Oedema	Degree (B <sub>1</sub> )				
		Muscles	Strength (B <sub>1</sub> )				
		Bones	Condition (D)				
Lungs		Adventitious sounds (A)					
Circulatory System.	Heart	Size (B <sub>1</sub> )					
		Rhythm (B <sub>1</sub> )					

Blood vessels & capillaries.	{	Murmurs Fo . . .						
		Resistance (C) . . .						
Anaemia . . .	.	Degree (Fe) . . .						
Allimentary Systems . . .	{	Appetite (B <sub>1</sub> ) . . .						
		Constipation (B <sub>1</sub> ) . . .						
		Diarrhoea (B <sub>1</sub> ) . . .						
Nervous System . . .	{	Deep tenderness (B <sub>1</sub> ) . . .						
		Sensation (B <sub>1</sub> ) . . .						
		Depression and lethargy (B <sub>1</sub> ) . . .						
General Constitution . . .	.	Bulld . . . . .						
Conclusion Vitamin A . . .	.	. . . . .						
B <sub>1</sub> . . . . .	.	. . . . .						
B <sub>2</sub> . . . . .	.	. . . . .						
B <sub>6</sub> . . . . .	.	. . . . .						
C . . . . .	.	. . . . .						
D . . . . .	.	. . . . .						
Fo . . . . .	.	. . . . .						
General . . . . .	.	. . . . .						



## ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.

## FIRST SURVEY OF SINGUR HEALTH CENTRE.

*Addendum concerning Married Women.*

Serial No.												
48. Age at marriage	-10yr. 1	-12yr. 2	-14yr. 3	-16yr. 4	-18yr. 5	-20yr. 6	-25yr. 7	-30yr. 8	over 30 yr. 9			
49. Age at cohabit	-10yr. 1	-12yr. 2	-14yr. 3	-16yr. 4	-18yr. 5	-20yr. 6	-25yr. 7	-30yr. 8	over 30 yr. 9			
50. Age at first pregnancy	Does not arise 1	-14yr. 2	-16yr. 3	-18yr. 4	-20yr. 5	-22yr. 6	-24yr. 7	-26yr. 8	-30yr. over 11			
51. Age at widowhood	-20yr. 1	-25yr. 2	-30yr. 3	-35yr. 4	over 35 yr. 5							
52. No. of terminated pregnancies including abortions.	0	1	2	3	4	5	6	7	8	9	10	11 and over.
Termination during (previous year)	1	2	3	4	5	6	7	8	9	10	11	
53. Result of delivery	No delivery. 1	Abortion. 2	Premature alive. 3	Premature dead. 4	Full term alive. 5							
	Full term dead. 6	Twins. 7	Sex. Male. 8	Female. 9								
54. Antenatal Care (1)	By whom	Medical. 1	Non-medical. 2	Place	Clinic. 3	Home. 4						
	Adequacy.	Adequate. 5	Inadequate. 6	Negligible. 7	Nil. 8							
55. Mode of delivery	Normal. 1	Instrumental. 2	Operative. 3									
Attendant at delivery	Doctor. 4	Midwife. 5	Not trained. 6	Relative. 8	None. 9							
Post-partum attendance. (2)	Medical. 10	Non-medical trained. 11	Non-medical untrained. 12									
56. Adequacy	Adequate. 1	Inadequate. 2	Negligible. 3	Nil. 4								
Longevity of infant	Died within						Alive.					
	week. 5	Month. 6	3 months. 7	6 months. 8	a year. 9		up to	a year				
57 58. Cause of death	Prematurity. 1	Birth injury. 2	Asphyxia. 3	Tetanus. 4	Marasmus. 5	Congenital physical defect. 6						
	Maternal Toxaemia. 7	Meningitis (T. B. and Non-T.B.) 8	Diarrhoea. 9	Smallpox. 10	Chickenpox. 11	Measles. 12						
	Whooping cough. 13	Diphtheria. 14	Pneumonia. 15	Fever. 16	Accident. 17	Others (specify). 18						
Terminations during (Year).												
59. Result of delivery	No delivery 1	Abortion 2	Premature live. 3	Premature dead. 4	Full term alive. 5	Full term dead. 6						

ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.

FIRST SURVEY OF SINGUR HEALTH CENTRE.

Addendum concerning Married Women—contd.

Serial No.	Twins. 7	Sex.	Male. 8	Female. 9					
(1)									
60. Antenatal Care	By whom	Medical. 1	Non-medical. 2	Place. 3	Clinic. 4	Home. 5			
		Adequacy.	Adequate. 6	Inadequate. 7	Negligible. 8	Nil. 9			
61. Mode of delivery	Normal. 1	Instrumental. 2	Operative. 3						
Attendant at delivery	Doctor. 4	Midwife. 5	Dai trained. 6	Dai untrained. 7	Relative. 8	None. 9			
(2)									
Post-partum atten- ance.		Medical. 10	Non-medical trained. 11	Non-medical untrained. 12					
62. Adequacy	Adequate. 1	Inadequate. 2	Negligible. 3	Nil. 4					
63. Longevity of infant	Died within								
	Week. 1	Month. 2	3 Months. 3	6 Months. 4	1 year. 5	—1m. 6	—3m. 7	—6m. 8	1yr. 9
									over 1 yr. 10
64—65. Cause of death	Prematurity. 1	Birth. injury. 2	Asphyxia. 3	Tetanus. 4	Marasmus. 5	Congenital physical defect. 6			
	Maternal toxæmia. 7	Neonitis (T.B. or Non-T.B.) 8	Diarrhoea. 9	Smallpox. 10	Chickenpox. 11				
	Measles. 12	Whooping cough. 13	Diphtheria. 14	Pneumonia. 15	Fever. 16	Accident. 17	Others (specify). 18		

NOTE (1).—Adequate when there is a complete physical examination in the Clinic and at least one more visit to the Clinic and three home visits. Negligible if no physical examination and no visits to the Clinic. Intermediate Cases are inadequate.

NOTE (2).—In case attendance is both medical and non-medical circle both 10 and 11 or 12 as the case may be. Adequate at least one home visit within 48 hours of delivery by a certified midwife or H. V. and a total of not less than 3 visits by the same agency. Negligible when two or less number of visits paid and none of the visits is made within 48 hours of the delivery.

Addendum for pregnant women.

1. Investigations Name and No.	Date. 2—3. Week of Survey.									
4. Union Board	Singur Balarambati Bora Begumpur.			5—9 Village (Name) and Code No.						
7—9. Family No.				10—14. Serial No.		Name.				
15. Age in years	. —15 1	—18 2	—20 3	—25 4	—30 5	—35 6	—40 7	—45 8	over 45 9	
16. Parity	. 1 1	2 2	3 3	4 4	5 5	6 6	7 7	8 8	9 9	10 over 10 11
17. Month of gestation	—2m. 1	—3m. 2	—4m. 3	—5m. 4	—6m. 5	—7m. 6	—8m. 7	—9m. 8	over 9m. 9	Not obtainable 10
18. Complaints	. None. 1	Tired. 2	Pain. 3	Sleeplessness. 4	Cough. 5	Fever. 6				
		Headache. 7	Falling sight. 8	Others (specify). 9						
19. General Appearance	Healthy. 1	Pale. 2	Oedematous. 3							
20. Albumin in urine	. Not known. 1	Yes. 2	No. 3							
21. Attending antenatal Clinic	Yes. 1	No 2	Nature of attendance. 3	Medical. 4	Non-medical. 5					
22. Home visiting	. Yes. 1	No 2	Nature of attendance. 3	Medical. 4	Non-medical. 5					

## ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.

## FIRST SURVEY OF SINGUR HEALTH CENTRE.

*Addendum concerning Infants.*

Family No.	Fetal No.		Age in months.												
44. Mother's life . . .	Alive (Fetal No. 1)	)	Dead, 2												
45. Where born . . .	Village, 1	Outside, 2	Place, 3	House, 3	Hospital, 4	Maternity Home, 5									
50. Delivered by . . .	Doctor, 1	Certified midwife, 2	Dai trained, 2		Dai untrained, 4		Relative, 5		None, 6						
51. Post natal care (First 10 days).	Doctor, 1	Health Visitor, 2	Midwife, 3	Dai, 4	Relative, 5		None, 6								
52. No. of times attended within 10 days.	1	2	3	4	5	6	7	8	9	10.					
53. Weight at birth . . .	Not recorded, 1		2 lbs— 2	3 lbs— 3	4 lbs— 4	5 lbs— 5	6 lbs— 6	7 lbs— 7	8 lbs— 8						
	9 lbs— 9		10 lbs— 10	11 lbs— 11	12 lbs— 12										
54. General development	Cannot hold up head, 1	Holding head, 2	Sit, 3	Stand without support, 4	Crawl, 5		Walk with support, 6		Walk without support, 7						
55. Teeth	1. a b c d e		2. a b c d e												
Number . . .	0	1	2	3	4	5	6	7	8	9	10				
56. Milk feed . . .	Mother's only, 1		Mother's + Fresh, 2		Mother's + Dry, 3		Fresh only, 4								
	Fresh + Dry, 5		All three, 6												
57. Other feeds . . .	Nil, 1	Cereals, 2	Sago, 3	Fruit, 4	Green Veg, 5		Egg, 6	Fish, 7	Meat, 8						
58. Age at Vaccination	Not vaccinated, 1		—3m., 2	—4m., 3	—5m., 4	—1 year, 5									
59. Attendance at clinic	None, 1	1, 2	2 or 3, 3	4, 4	5, 5	6, 6	7, 7	Reason, 8	Sick, 9	Healthy, 10	Sick + Healthy, 10				
60. Illness history up to 1 month.	Nil, 1	Measles, 2	Whooping cough, 3	Smallpox, 4	Chicken pox, 5	Diphtheria, 6		Pneumonia, 7							
	Pollomycellitis, 8		Diarrhoea or Dysentery, 9		Bronchitis, 10		Others (specify), 11								
61. Illness history from one to 3 months.	Does not arise, 1		Nil, 2	Measles, 3	Whooping cough, 4	Small-pox, 5		Chicken pox, 6							
	Diphtheria, 7		Pneumonia, 8		Pollomycellitis, 9		Diarrhoea and Bronchitis, 10		Others (specify), 11						
62. From 3 to 6 months	Same as 61	1	2	3	4	5	6	7	8	9	10	11	12		
63. From 6 to 9 months		1	2	3	4	5	6	7	8	9	10	11	12		
64. From 9 to 12 months		1	2	3	4	5	6	7	8	9	10	11	12		
65. Index of Family Prosperity.		1	2	3	4	5	6	7	8	9	10	11	12	13	14

## ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.

## FIRST SURVEY OF SINGUR HEALTH CENTRE.

*Addendum concerning pre-school child.*

Family No.	Serial No.											
48. Age in months at weaning.	Not yet weaned.	—6m.	—9m.	—12m.	—15m.	—18m.	—21m.	—24m.	—27m.			
	1	2	3	4	5	6	7	8	9			
	—30m.	—36m.	Over 36m.									
	10	11	12									
	Regularity.					Cleanliness.						
49. Milk feeding	Nil.	—10 ozs. per day.	10 ozs. and over per day.	Regular.	Irregular.	Clean.	Unclean.					
	1	2	3	4	5	6	7					
	Green vegetables.					Fruits.						
50. Vegetable Food	Nil.	Cereals.	Nil.	Less than daily.	Daily.	Nil.	Less than twice a week.	Twice a week or more.				
	1	2	3	4	5	6	7	8				
	Eggs.			Fish.			Meat.					
51. Animal Food	Nil.	Less than twice a week.	Twice a week or more.	Nil.	Less than twice a week.	Twice a week or more.	Nil.	Less than twice a week.	Twice a week or more.			
	1	2	3	4	5	6	7	8	9			
52. General Development (Locomotion).	Crawling.	Walking with support.		Walking without support.		Running.						
	1	2		3		4						
Speech.	Speaking.	Not speaking.										
	5	6										
53. Rickety	No	Yes.										
	1	2										
54. Teeth	Less than 20.	More than 20.										
	1	2										
55. Anterior Fontanelle	Open.	Closed.										
	1	2										
	Regularity.											
56. Attendance at clinic	Nil.	Yes.	Regular.	Irregular.	Reason Sickness.			Health.	Sickness and Health.			
	1	2	3	4	5			6	7			
57. Average number of visits per year.	—0	—12	—18	—24	—30	—36	—42	42+				
	1	2	3	4	5	6	7	8				
58. Diseases within 1 year	Nil.	Measles.	Whooping cough.		Small-pox.		Chicken Pox.		Diphtheria.			
	1	2	3		4		5		6			
	Bronchitis.		Pneumonia.		Pollomyelitis.		Diarrhoea or Dysentery.		Others (specify).			
	7		8		9		10		11			
59. Diseases within 2 years.	(Same as 58)											
	1	2	3	4	5	6	7	8	9	10	11	
60. Diseases within 3 years.	Does not arise.	Nil.	Measles.	Whooping cough.		Small pox.		Chicken pox.	Diphtheria.			
	1	2	3	4		5		6	7			
	Bronchitis.		Pneumonia.		Pollomyelitis.		Diarrhoea or Dysentery.		Others (specify).			
	8		9		10		11		12			
61. Diseases within 4 years	(Same as 60)											
	1	2	3	4	5	6	7	8	9	10	11	
62. Diseases within 5 years.	(Same as 60)											
	1	2	3	4	5	6	7	8	9	10	11	
63. Weight	Regular record maintained.											
	1											
Height	3											
	4											
64. Index of family prosperity.	1	2	3	4	5	6	7	8	9	11	12	
	1	2	3	4	5	6	7	8	9	11	12	

ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.  
FIRST SURVEY OF SINGUR HEALTH CENTRE.  
*Addendum for School Child.*

(1) Serial No.	(1) Investigator.	(1) Family No.		(1) Village No.		(1) Union Board.							
		Male	Female.	Standard.	Standard.	Male	Female.						
1. Age . . .		-5 yrs. 1	-6 yrs. 2	-7 yrs. 3	-8 yrs. 4	-9 yrs. 5	-10 yrs. 6	-11 yrs. 7	-12 yrs. 8	-13 yrs. 9	-14 yrs. 10	-15 yrs. 11	15 yrs. + 12
2. Sex . . .		Male 1	Female. 2	Standard. 3	I 4	II 5	III 6	IV 7	V 8	VI 9	VII 10	VIII 11	IX 12
(3) Name of School.		-0 mths. 1	-1 yr. 2	-2 yrs. 3	-3 yrs. 4	-4 yrs. 5	-5 yrs. 6	-6 yrs. + 7					
3. Period of attendance at the school.		1 8	2 9	3 10	4 11	4 + 12							
No. of medical examinations.		1	2	3	4	5							
4. Infectious diseases (Year).		Cholera. 1	Dysentery. 2	Small-pox. 3	Chicken pox. 4	Measles. 5	Whooping Cough. 6	Diphtheria. 7	Pollomyelitis. 8	Malaria. 9			
5-6. Period of Sick- ness (Year).		Actual No. of days up to 28 days. 20	-5 wks. 20	-6 wks. 30	-7 wks. 31	-8 wks. 32	-9 mths. 33	-4 mths. 34	-6 mths. 35	-6 mths. 36	6 mths. + 37		
(4) 7-8. Period of ex- clusion (in days).		-1 wk. 1	-2 wks. 2	-3 wks. 3	-4 wks. 4	-2 mths. 5	-3 mths. 6	-4 mths. 7	-5 mths. 8	-6 mths. 9	0 mths. + 10		
9. Sickness absentees		Yes. 1	No. 2	Yes. 3	No. 4	Yes. 5	No. 6	Yes. 7	No. 8	Yes. 9	No. 10	Yes. 11	No. 12
(5) 10-11. Health know- ledge:—		(a) Infection—can- sation of disease.	(b) Insects, habits and significance.	(c) Excreta disposal	(d) Water supply protection.	(e) Food—value of milk.	(f) Exercise; health- significance.						



(3)  
 ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.  
 FIRST SURVEY OF SINGUR HEALTH CENTRE.  
*Addendum for School Child—contd.*

(1)  
 Union Board.

(1)  
 Village No.

(1)  
 Family No.

Serial No.	Investigator.	3	4	5	6	7	8	9	10	11	12	13	14	Small-pox vaccination.	Small-pox revaccination.	Typhoid.	Cholera.	Plague.	Rabies.	Others (specify).
	(b) Management of latrine.																			
	(c) Management of mosquito breeding.																			
	(d) Management of fly breeding.																			
	(e) Dusting furniture																			
	(f) Weed removal																			
	(g) Meals management.																			
16.	Artificial Immunisation.	NH. 1												Small-pox vaccination.	Small-pox revaccination.	Typhoid.	Cholera.	Plague.	Rabies.	Others (specify).
	When Immunised.	-0 mths.												2 yrs. +	2 yrs. +					
		9												10	11					

# ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH CALCUTTA.

## FIRST SURVEY OF SINGUR HEALTH CENTRE.

### Patient's Schedule.

Family No.	Investigator's Name & No.	Date.	Week of Survey.	Union Board.	Singur. Balarambati. Dora. Begumpur.	Village: Name and No.
Serial No.						
(1) Present complaints						
(2) Previous history.						
Present Medical attendance.	Indigenous qualified.	Not qualified.	Nursing.	Qualified.		Neighbour and friend's.
Physician examination.	General Emaciation.		Temperature.			
			Present—			
			Variation—			
(3) Acuteness of disease.						
(4) Respiration.						
(5) Lungs—L.						
(6) Heart.						
(7) Abdomen.						
(8) Genito-urinary system.						
(9) Nervous system.						
	(11) Special senses.—Tongue.	(12) Stools.	(13) Vomit.	(14) Cough.	(15) Urine.	
	Eye. Ear. Nose.					
Laboratory examination.	Stool.	Vomit.	Sputum.	Urine.	Throat Swab.	
	Blood film.	Blood culture.	Blood Agg.	Kahn.	Other tests.	
Treatment	Primary.	Secondary.	within five miles,	at sub-divisional H.Q.,	(distance in miles).	
Diagnosis	Specific.	available, in village.	at Distt. H.Q.,	only Calcutta.		
	Symptomatic.	available, in village.	within five miles.	at sub-divisional H.Q.	(distance in miles).	



## ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA..

## FIRST SURVEY OF SINGUR HEALTH CENTRE.

*Home visiting schedule in connection with cases of infectious diseases.*

Investigator's Name	Family No.	Serial No.
Date of visit		
(1)		
Head of Family's name		
(2)		
Relation to patient		
(3)		
Patient's name		Serial No.
(4)		
Date of first symptoms	(5) Date to bed	
(6)	(7)	
Clinical diagnosis	Laboratory confirmation	
(8)		
Notifiable		
(9)		
Primary, relapse or second attack—	Dates	
Previous attacks—	Dates	
(10)		
Inoculation history		
Primary inoculation	Date	
Re-inoculations	Date	
(11)		
Contact with patient	Stage	
date	close	distant -
Contact with known carriers	Date	
	close	distant -
(12)		
Contact with any other source of infection		
Place of attack		
(13)		
Movements	Date	Object -
Place		
Visitors		
Dates		
Places		
(14)		
Infection status		
Imported food or clothing		
Dates		
Places		
(15)		
infected ?		
Water supply		
i. Drinking : source		
(15)		
infected ?		
ii. Bathing : source		
(15)		
infected ?		
iii. Household : source		
(15)		
infected ?		
Milk supply : source		
(15)		
infected ?		
(16)		
Food :		
i. Home		
(17)		
Meals out	date	
	(15)	
	infected ?	
ii. Outside : Part	whole	
(15)		
infected ?		

(2)  
iii. Fruits and vegetables (taken raw) ; source

(15)  
infected ?  
source  
(15)  
infected ?

iv. Special articles

(20)

Insects.

Mosquitoes

Species

Flics

"

Fleas

"

Sand-flies

"

Lice

"

Bedbugs

"

Ticks

"

Mites

"

Other carrier insects

"

(21)

Patient's infectious status

State of cleanliness

(22)  
i. House in general

(23)  
ii. Patient's room

(24)

State of isolation

Collection of

Disposal of

Stools

Urine

Sputum

Clothes

Other infectious material

If school whether excluded or not

(25)

Utensils

(26)

Nursing

Relations

Professional

(27)

Persons in the Family (other than patients)

Age.

Sex.

Occupation.

Immunity  
status.

Relation to  
patient.

Preventive  
measure.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.

" (28)

Notified ?

date

by whom

(29)

Concurrent disinfection

(30)

Terminal disinfection

(31)

Other means of control : adopted

not adopted but available  
why ?

(3)

(32)  
 Specific knowledge of causation  
     source  
     when obtained in relation to present case.

(33)  
 Responsiveness  
     Reasons if not responsive

(34)	Outside assistance	
	Official	Non-official
	Nature	Efficiency
	Adequacy	

(35)  
 Economic loss  
     Duration of illness  
     Loss of earning  
     Sickness expenses  
     Loss in case of death :

(36)	Likely disabilities :	temporary
		permanent
		<i>preventable : means</i>

(37)  
 Summary and general recommendations.

## ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.

## FIRST SURVEY OF SINGUR HEALTH CENTRE.

## Family Schedule.

1. Investigator's Name.		Date.		2-3 Week of Survey.		4. Union Board.	
5-6. Village No.		7-9 Family No.					
(1) 10. Nature of Family		Single. 1	Joint. 2	Multi. 3			
History of terminations (Year)							
For Groups I & II (occurring in the village)							
11. Abortion . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
12. Still birth . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
13. Live birth (Male) . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
14. Live birth (Female) . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
For Groups I & II (occurring outside the village)							
15. Abortion . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
16. Still birth . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
17. Live birth (Male) . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
18. Live birth (Female) . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
For Groups III & IV (occurring in the village)							
19. Abortion . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
20. Still birth . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
21. Live birth (Male) . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
22. Live birth (Female) . . . . .	0	1	2	3	4	5	6
	1	2	3	4	5	6	7
Family culture.							
(2) 23. Outlook on food . . . . .	Rational. 1	Traditional. 2		Prejudiced. 3			
(2) 24. Outlook on cause of disease.	Rational. 1	Religious. 2	Demonistic. 3	Other Supernatural. 4			
(2) 25. Outlook on prevention and cure of disease.	Rational. 1	Religious. 2	Fatalistic. 3	Stoic. 4			
26. Community sense for organised effort.	Individualistic. 1	Balanced. 2		Highly Socialistic. 3			
27. Quinine distribution (Prophylactic).	Yes. 1	No. 2					
(3) 28. Economic schedule . . . . .	Not done. 1	Done. 2	Prosperity index.		1	2	3
					4	5	6
					7	8	9

Singur.  
1  
Balarambati.  
2  
Bora.  
3  
Begumpur.  
4

*Report on Diet Survey of the Family.*

Consumption Units.	PROXIMATE PRINCIPLES AND ACCESSORY FACTORS.										
	Calories.	Proteins.		Fat.	Carbo- hydrate.	Minerals.			Vitamins.		
		Animal.	Veg.			Ca	P	Fe	Carotene Vit. A.	Vit. B	Vit. C.
Requirement											
Consumption											
Deficiency											

—	—	Gross deficiency.	Moderate defi- ciency.	No deficiency.
31	Protein Animal . . .	1	2	3
32	Protein Veg. . . . .	1	2	3
33	Fat . . . . .	1	2	3
34	Carbohydrate . . . . .	1	2	3
35	Calcium . . . . .	1	2	3
36	Phosphorus . . . . .	1	2	3
37	Iron . . . . .	1	2	3
38	Carotene and Vit. 'A . . .	1	2	3
39	Vit. B . . . . .	1	2	3
40	Vit. C . . . . .	1	2	3

## ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.

## FIRST SURVEY OF SINGUR HEALTH CENTRE.

## Economics Survey Schedule.

## EXPENDITURE.

## A. On consumption.

	Home produce.		Cash purchase.		Value.
	Quantity.	Value.	Quantity.	Value.	Rs. A. P.
1. Food (monthly basis)		Rs. A. P.		Rs. A. P.	2. Fuel & light (yearly basis)
(i) Cereals					3. House-rent or house tax
(ii) Pulses					4. Clothing, bedding & footwear.
(iii) Vegetables					5. Toilets, if any
(iv) Salt & spices					6. Furniture
(v) Sugar & sweets					7. Education
(vi) Milk, curd, etc.					8. Medical advice & medicines
(vii) Butter, Ghee, oil.					9. Travelling
(viii) Meat, fish, egg, etc.					10. Ceremonies
(ix) Others					11. Payment for debt Discharge (Principal)
Total (monthly)					12. " (Interest)
Total (annual)					13. Miscellaneous
					Total

## B. On production (yearly basis)

1. Cattle.
2. Plough repairs, etc.
3. Land taxes, if any.
4. Irrigation charges, if any.
5. Manure.
6. Labour charges.
7. Seed.
8. Miscellaneous.

Quantity. Value.  
Rs. A. P.

Total

Grand Total

(4)  
28. Average annual income *per capita* in Rs.

—48 —60 —80 —120 —150 —175 —200  
1 2 3 4 5 6 7

29. Average annual expenditure *per capita* in Rs.

—48 —60 —80 —120 —150 —175 —200  
1 2 3 4 5 6 7  
—250 —300 —350 over 350  
8 9 10 11

30. Average annual saving or deficit *per capita*.

31-32. Index of prosperity.

	A	B	C	D	E
I	1	2	3	4	5
II	6	7	8	9	10
III	11	12	13	14	15

*Family No.*

No.	Name of Food.	At the begin- ning.	Gain. Loss.	Daily Account. From To															Gain or Loss.	Net avail- able.	At the end.	Net con- sumed.
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15				
			Gain.																			
			Loss.																			
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(2)  
ALL INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.  
FIRST SURVEY OF SINGUR HEALTH CENTER.

## Sanitary Assessment of House.

**2-8, Week of Survey**

**Date.**

[illegible]

## B. Cleanliness.

21. (a) Mosquito-breeding Area	Clean—Perimeter	—50'— 2 1/2	—100'— 3	—150'— 4	—200'— 5	250'— 6
22. (b) Fly-breeding places	Dirty—Perimeter	Medium size 2	Large 3	Extensive 4		
(8)						
23. (c) Jungle and weeds	Clean 1	Rank growth 3	Jungle 4			
(9)						
C. Drainage	Good 1	Inadequate 2	Poor 3	Not drained 4		
HOUSE—INSIDE.						
(16)						
24. General conditions	Good 1	Fair 2	Bad 3			
(A) Living Rooms.						
(10)						
25. (a) Overcrowding	Floor area	Square ft. per person	—36— 1	36— 2	42— 3	50— 4
(11)			Inadequate 6	Poor 7		
(b) Ventilation						
(12)			Inadequate 2	Poor 3		
26. (c) Lighting						
(13)						
27. (d) Dampness	Roof	Good order 1	Leaky 2	Floor	Moderately Dry 4	Damp 5
(14)						
(e) Cleanliness						
28. Premises		Clean 1	Moderately clean 2	Dirty 3	Rooms. Clean 4	Moderately clean 5
(15)						
29. Ratharbourago	Present 1	Absent 2	Other pests (Ants, Cockroach, bed-bugs)	Present 3	Absent 4	Dirty 6

## ALL INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.

## FIRST SURVEY OF SINGLE HEALTH CENTRE.

## Sanitary Assessment of House—contd.

(3)

## (B) KITCHEN.

30. General condition .	Good 1	Fair 2	Bad 8
31. (a) Cleanliness?	Clean 1	Moderately clean 2	Dirty 134
(b) Food .	Protection from flies	Yes 4	No 5
32. (c) Floor .	Drained 1	Not drained 12	
33. (d) Smoke Outlet .	Satisfactory 113	Unsatisfactory 2	
34. (e) Storage of Provisions	Rat Proof 1	Not rat proof 2	
WASHING & BATH- ING.			
35. Private facilities .	Not available 1	Inadequate 12	Adequate & used 3
			Adequate and not used 4

## WATER SUPPLY.

A. Sources					
36. (a) Drinking .	Tube well 1	Surface well 2	Reserved tank 3	Unreserved tank 4	River 5
(b) Domestic .	Tube well 6	Surface well 7	Reserved tank 8	Unreserved tank 9	River 10
Tube-well Supply (if present).					
37. (a) Distance .	—10 yds. 1	—50 yds. 2	—200 yds. 3	200 yds. and above 4	
(b) Working order .	Good 5	Unsatisfactory 10	Not working 17		
38. (c) Apron .	Good 1	Bad 2	Nil 3		
(d) Leadway drains	Adequate 4	Inadequate 5	Nil 6		
39. Surface well (if present and used).	Open 114	Closed 2			

40. (a) Casing . . .	Good 1	Bad 2	(4) Nil 3			
(b) Paraph. . .	Good order 4	Bad 5	Nil 6			
41. (c) Leadway drains	Good order 1	Bad 2	Nil 3			
(d) Distance . .	—10 yds. 4	—50 yds. 3	—200 yds. 0	200 yds. and above 7		
42. (e) Drawing of water	Pump 1	Pulley 2	Common bucket 3	Individual bucket 4		
(f) Distance from latrines, manure pits, etc.	Liable to pollution 6	Not liable to pollution 0				
TANK (UNRESERVED).						
43. . . . .	Clean 1	Obviously contaminated 2				
44. (B) Quantity . .	Abundant 1	Sufficient 2	Scarce 3	Scarce at seasons only 4		
(C) Treatment (of drinking water only).	Boiled 3	Unboiled 0	Chemically treated 7			
GARBAGE AND REFUSE.						
(A) Containing human faeces.	Does not arise 1	Heap 2	Pit covered 3	Pit uncovered 4	Incinerated 6	Water 0
45. Disposal . . .	Thrown away indiscriminately 7	Thrown away indiscriminately 7	Removed to field 8	Removed by public agency 9	Composting 10	
(b) Containing putrescible matter other than human faeces.						
46. Disposal . . .	Does not arise 1	Heap 2	Pit covered 3	Pit uncovered 4	Incinerated 6	Water 0
(c) Containing unputrescible matter.	Thrown away indiscriminately 7	Thrown away indiscriminately 7	Removed to field 8	Removed by public agency 9	Composting 10	
47. Disposal . . .	Does not arise 1	Heap 2	Pit covered 3	Pit uncovered 4	Incinerated 6	Water 0
	Thrown away indiscriminately 7	Thrown away indiscriminately 7	Removed to field 8	Removed by public agency 9	Composting 10	

(5)  
**ALL INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.**  
**First Survey of SINGUR HEALTH CENTRE.**  
*Sanitary Assessment of House—contd.*

**TABLE AND CAT-  
 TERED REFUSE  
 IF SEPARATE.**

48. Solid . . .	Disposal	Does not arise 1	Manure pit 2	Heap 3	Dung Cake 4	
Liquid . . .	Disposal.	Does not arise 6	Sump with outlet 6	Sump without outlet 7	Waste 8	
49. Urine . . .	Provided and used	—0 2	Provided and not used 2	Not provided 3	10 and above 6	
50. (a) Number of person per seat .	Bucket	Hanging 7	Pit latrine 8	Surface without bucket 4	Bora hole 10	Very dirty 6
(b) Type . . .	Clean	Dirty 2	Very dirty 3	Cleanliness behind 0	Dirty 6	
51. (c) Cleanliness inside	Present	Probable 2	Absent 3			
52. (d) Soil pollution .						
(e) Drainage . . .	Satisfactory	Unsatisfactory 6				
53. (f) Faecal matter .	Accessible to flies	Not accessible to flies 2	By public agency 5	Private 6		Incinerated 4
(g) Removal . . .	Does not arise	Not removed 4	Scattered on the fields 2	Dumped in water 3		
54. (h) Disposal . . .	Does not arise	Scattered on the fields 2	Buried 6			
	Thrown indiscriminately		Unsatisfactory 0			
55. (i) Liquid (if separate ly disposed).	Does not arise	Satisfactory 8	Sleeping on floor 2			
Furnishings . . .	Sleeping on bed or wooden plank					
Cooking utensils . .	Earthen 4	Metallic 6	Both 6			
56. Fire Protection .	Adequate	Fair 2	Inadequate 3			
57. Cattle . . .	Inside the house		Separate shed 3			
Cleanliness of cattle shed.	Satisfactory	Satisfactory 6	Unsatisfactory 6			
58. Poultry . . .	Does not arise	Controlled 2	Uncontrolled 3			
59. Pig . . .	Nil 1	Controlled 2	Uncontrolled 3			

*Collection of Adult Anophelines.*

**Families.....**

Village.....

Investigator's Name.....

Date.....

[illegible]

## REPORT ON THE COLLECTION OF LARVAE.

Union Board.....

Families.....Investigator.....

Village.....

Date.....

House No.	L. B. No.	Type of breeding places.	Description of the breeding places.	Remarks.





	A	B	C	D	E	F	G	H
<i>Sanitation—</i>								
Condition of school building—								
(3) Roof . . . . .								
(4) Floor . . . . .								
(5) Walls . . . . .								
(6) Teachers' room . . . .								
(7) Cleanliness . . . . .								
(8) Protection from . . . .								
Sun . . . . .								
Rain . . . . .								
(9) <i>Light—</i>								
Class room . . . . .								
Teachers' room . . . .								
(10) <i>Ventilation—</i>								
Class room . . . . .								
Teachers' room . . . .								
(11) <i>Space—</i>								
Floor space per scholar . .								
<i>Furniture—</i>								
(12) Benches . . . . .								
(13) Benches with rest . . .								
(14) Black board . . . . .								
(14a) Distance between black board and last bench.								

	A	B	C	D	E	F	G	H
<i>Latrines—</i>								
(15)								
Accommodation . . .								
Separate for teachers . .								
Separate for boys and girls .								
(16)								
Maintenance . . .								
<i>Urinals—</i>								
Adequacy . . .								
Separate for boys and girls .								
<i>Water supply—</i>								
(17)								
Safe . . .								
(18)								
Storage and distribution .								
(19)								
Adequacy . . .								
<i>Refuse disposal—</i>								
(20)								
Dustbin for whole school .								
(20)								
Water paper basket for classes								
(21)								
Disposal satisfactory . .								
<i>Play ground—</i>								
(22)								
Adequacy . . .								
(23)								
Condition . . .								
<i>Compound—</i>								
Vegetable garden . .								
Flower garden . .								
Fly breeding . .								
Mosquito breeding . .								

	A	B	C	D	E	F	G	H
<i>Hygiene—</i>								
Health Education procedure and instruction.								
Morning inspection . . .								
Health habit training . . .								
Individual booklet . . .								
Class room chart . . .								
Use of handkerchiefs . . .								
Storage of drinking water . .								
Individual drinking cups . .								
Regular weighing & measuring								
Individual class cupboards . .								
Pupil participation . . .								
Midday meal . . .								
Supervised play & game . .								
Direct teaching of Hygiene . .								
Teaching by correction . . .								
Field visits & exercise . . .								
Health scrap books and log books.								
First Aid equipment . . .								
Talk by Sanitary Inspectors . .								
Talks by nurses—frequency per month.								
Little mothers' classes—frequency per month.								
<i>Communicable diseases Control</i>								
Antityphoid inoculations . .								
No. vaccinated . . .								
Anti smallpox vaccination . .								
No. vaccinated . . .								
Quinine distributed . . .								



	A	B	C	D	E	F	G	H
<i>Hygiene—</i>								
Health Education procedure and instruction.								
Morning inspection . .								
Health habit training . .								
Individual booklet . .								
Class room chart . . .								
Use of handkerchiefs . .								
Storage of drinking water .								
Individual drinking cups .								
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No. vaccinated . . .								
Quinine distributed . .								



**ALL-INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.**  
**FIRST SURVEY OF SINGUR HEALTH CENTRE.**  
**Schedule for Sanitary Survey of Village.**

- Student's Name..... Date.....
1. Name of village..... 3. Population. Male. Female.
2. Location, Union board..... Adults.....
- Health circle..... Children.....
- District..... Total population.....
4. Extent of built-up area.....acres; Density per acre.....
- Extent of Jungle area.....acres;

5. (a)

*Communications—*

Railway . . . . .	good, fair, poor.
Road . . . . .	good, fair, poor.
Waterway . . . . .	good, fair, poor.
Foot-path . . . . .	good, fair, poor.
Post & telg. . . . .	good, fair, poor.

6. (b)

Lay out—Built up area.....acres . . . . .	good, fair, poor.
Total area.....acres . . . . .	good, fair, poor.

(c)

Parks and playgrounds.....acres . . . . .	good, fair, poor,
Total area.....acres . . . . .	.

(d)

Roads—wide, narrow, blind.  
 Roads—clean, dirty, dusty, watered.  
 Roads—lighted at night, poorly lit, not lit.

(e)

Generally compact, crowded, ribbon development.

(f)

**7. Water supply.**

*Public and common sources.*

Tube wells.			Dug or built wells.			Tanks.			River-Channel.			Piped.		
Uses.	P.	U.	Uses.	P.	U.	Uses.	P.	U.	Uses.	P.	U.	Uses.	P.	U.
Drinking Bathing & Washing.			Dr. B. & W. only			Dr. B. & W. only.			Dr. B. & W. only.			Dr. B. & W. only		

*Private sources.*

Tube wells.			Dug wells.			Tanks.			Piped.		
Uses.	P.	U.	Uses.	P.	U.	Uses.	P.	U.	Uses.	P.	U.
Drinking, Bathing & Washing only.			Drinking, Bathing & Washing only.			Drinking, Bathing & Washing only.			Drinking, Bathing & Washing only.		

No. of abandoned tube wells—  
 due to want of repairs.....  
 due to choking.....

No. of abandoned wells.....due to.....

(g)

Adequacy. Satisfactory, fair, poor.

(h)

Sanitary quality & protection. Satisfactory, fair, poor.

Bact. exam. No. per year.....

8. Housing. Total No. of houses.....

(i)

Total No. of tenement house.....or.....%

Over-crowded houses.....or.....%

Grade A or B houses.....or.....%

9. Drainage. Terrain undulating, level, cupshaped.

Liabile to occasional flooding, frequent flooding, to flooding.

Satisfactory drained.

10. *Collection & disposal of human excreta.*

Good & well maintained latrines.....; water carriage.....  
 bucket.....; bore-hole pit.....  
 Poorly maintained latrines.....; bucket.....; bore-hole pit.....  
 Houses without latrines.....% of total.  
 Public latrines in good order with washing facilities.  
 Conservancy.....labourers.....days per week service, by.....  
 carts, labour. Disposal by.....; area.....acres;  
 distance from village.....(in miles).

11. *Collection and disposal of refuse.*

Collection from private cans, public bins every.....days.  
 No. of public bins.....; No. of labourers.....;  
 No. of carts.....; adequate; inadequate.....;  
 Disposal by.....satisfactory, bad;  
 Distance (place of disposal from village).....miles.

12. *Disposal of the dead.*

Cemeteries: adequate, insufficient.  
 Cremation: satisfactory, unsatisfactory.

13. *Food.*

Restaurants & tea shops,  
 clean poor clean poor

(i)

Markets Provision shops  
 good poor good poor.

Meat inspection: satisfactory, nil.

Milk supply: adequate; inadequate.

good. bad  
 examined, not examined.

(b)

14. *Amenities.* Lodging houses: good.....; poor.....;

Public buildings.....

Schools.....

Hospitals.....

Clubs.....

Transport facilities.....

Pasture land.....

Markets.....

15. *Mosquito breeding.*

(1)

A hite.

Fly breeding.

(ii)

.....houses breeding present.

Larvae

.....houses breeding absent.

16. *Vital Statistics.*

Primary agency.....

Verification.....

Keeper of village books.....

(iii)

Compilation.....

(iv)

17. *Offensive trades.*

Factory.....

Slauhter houses.....

Brick kiln.....

Lime kiln.....

18. *Notable facts in the last 10 years.*

(a)

1. Growth of population: normal, abnormal, subnormal

2. Organized industries: merely started.....; declining.....

3. Cottage industries: thriving.....; declining.....

4. Epidemics of.....year.....year.....year.....

5. Trade: improving, declining, stationary, not known.

6. Agriculture: improving, declining, stationary, not known.





## APPENDIX II—continued.

## LIST OF KEYS (P. 247-266)

1. Key to General Individual Schedule
2. List of Diseases for cause of death and sickness
3. Key to Nutritional Assessment Schedule
4. Key to Addendum for School Child
5. Key to Patient Schedule
6. Key to Home Visiting Schedule in connection with cases of infectious diseases
7. Key to Family Schedule
8. Key to Sanitary Assessment of House
9. Key to Students' Survey School Schedule
10. Key to Schedule for the Sanitary Survey of Village

## ALL INDIA INSTITUTE OF HYGIENE AND PUBLIC HEALTH, CALCUTTA.

## INSTRUCTIONS TO SURVEY PARTIES.

1. Outdoor hours 8 to 12 and 2 to 5 including travelling. If alteration is desired previous sanction must be obtained.

2. Weekly Report for work ended Saturdays must be despatched to reach this office on Monday mornings on prescribed form. This will be separate for the Demonstrator and for Sanitary Inspector.

3. The work must be planned for the whole period and a time table made. Weekly excess or deficiency should be shown in the report.

4. The weekly report will also show the programme for the ensuing week and indicate the remarks when deviation from the normal programme has been made with reasons why.

5. Any requisition for schedules, stationery and other requisites should be sent addressed to the Professor giving one weeks notice.

6. Please note the address and the time of return on a board so placed at the quarters as to be clearly visible from outside, when going out of the quarters whether an official or unofficial business.

7. Sunday will be a holiday provided the party is not behind the scheduled time in its work. One may leave station on that day without specific permission if the above condition is satisfied.

No other holidays will be permitted unless so notified. Leave can only be availed of after receipt of sanction. Grant of leave may be conditional.

8. Clinical material and schedules should be submitted as soon as collected or completed (without awaiting the laboratory results). They should be accompanied by the respective peon books for recording receipts. Correspondence register is also provided which should be kept posted up to date.

9. A stock register should be kept.

10. It will be useful to send in writings any observation of interest made but not specifically included in the schedules.

11. The population of the four Union Boards is over 60,000. It is not possible to collect all the information concerning the whole population. A system of sampling has therefore been desired as follows:

## A. Sample.

This contains 10,000 population in.....families distributed in the four union boards as below:—

Singur	.	.	.	.	.	.	.	.	.
Balarambati	.	.	.	.	.	.	.	.	.
Bora	.	.	.	.	.	.	.	.	.
Begampur	.	.	.	.	.	.	.	.	.

A. Sample. B. Sample.

B. Such sample contains.....populations in.....families as shown above.

The following schedules must be filled for B. Such sample but one must aim at collecting information for A sample.

1. General Individual schedule for all.
2. Women 15+ groups (or married women)

3. Infant.
4. Preschool.
5. School.
6. Family.

Sample.

This contain.....population in.....families distributed in the four Union Boards as below :—

Singur.  
Balarambati.  
Bora.  
Begampur.

This sample is for the collection of clinical material (for patients there is no restriction to sampling).

Serial No.	Token No.
Union Board.	Investigator.
Nature of Sample	
Collection	Date
	Time.
Result.	
	Signature.
	Date.

This will be in duplicate. It will be prepared at the time of distribution of flags or container for the individual. Token is tied to the flags in case of stools or to the container in case of other clinical material. After collection one copy will be pasted on the bottle or container and token removed. The other will accompany the sample to the laboratory for filling in the result and return. After noting the result in an appropriate schedule the original will be submitted to the Professor.

#### GENERAL INSTRUCTIONS.

1. For the survey the following field equipment should be carried :
  - (a) Measuring tape.
  - (b) Weighing machine.
  - (c) Calipers for hip measurement.
  - (d) Talquist's haemoglobinometer.
  - (e) Clinical material collection forms.
  - (f) Slides.
  - (g) Identification sticks for collection of stools.
  - (h) Receptacles for collection of stools.
  - (i) Kit for Mantoux test.
  - (j) Grip measurement instrument.
  - (k) Diary.
2. In the preparation of blood films prepare both thin and thick films.
3. Definitions of common terms.
 

Age—means completed years of life unless otherwise mentioned.

Family—is defined as a unit having a common kitchen.
4. When period is specified as 'past one year' or 'past one month', etc., a fixed starting time which will be specified before the beginning of the survey should be used throughout the survey.

## ALL INDIA INSTITUTE OF HYGIENE &amp; PUBLIC HEALTH, CALCUTTA.

## FIRST SURVEY OF SINGUR HEALTH CENTRE.

*Key to General Individual Schedule.*

1. Week ending Saturday, the first week counts from the beginning of the survey.
2. Family number or individual serial number as any other serial number once fixed remains constant for all the schedules in which the item is recorded.
3. There are six groups into which residential status may be classified. These are :

Group I . . . .	belonging to the village.	Normally resident	Presence at the time of survey.
Group II . . . .	Do. . . .	Do. . . .	Absent.
Group III . . . .	Do. . . .	Not Do. . . .	Present.
Group IV . . . .	Do. . . .	Not Do. . . .	Absent but visited during the year.
Group V . . . .	Visitors . . . .		Present
Group VI . . . .	Do . . . .		Absent but visited during the year.

Visitors include married daughters and their children normally living separately with their own families.

4. 'Year' when appended within brackets to any item refers to the last twelve months prior to the date of commencement of the survey. Mark the actual period of stay diagrammatically in the space provided by two distinct vertical lines and shade the intervening space. If the period is broken show each period similarly.

5. Since it is intended to obtain information about the exact age in years continue markings in columns 17 and 18. Thus if an individual is 12 years of age *i.e.*, he has completed 12 years but not 13, circle 3 of column 17 and 3 of column 18.

6. This information is required for infants only. However appropriate numbers should also be circled in columns 17 and 18 for infants also.

7. It is not always easy to differentiate between an occasional user and an addict but a broad distinction is that the former can give up the habit without suffering from subjective or objective symptoms.

8. Liberal profession includes education, ecclesiastical, medicine, law engineering, administration (exclusive of inferior services).

9. For purposes of nutritional investigation.

Example to guide classification :—

Light work . . . Domestic work, clerical work, tailoring, shopkeeping, teaching.

Moderate . . . Ordinary agricultural operations including ploughing.

Hard . . . Sawing of wood.

Very hard work . Digging and sports.

10. Wage earner is one who would be normally expected to maintain the family, whether actually earning or not.

11. A 'literate' can just read and write a letter in any one language.

12. By intellectual leadership is meant the quality of a man which enables him to urge people to desirable type of action by virtue of argument, example or personality. Only those who distinctly stand out amongst others may be included amongst the leaders.

13. Mention only such sickness as has occurred in the village.

14. The Chronological order in which sickness relating to the disease occurred.

15. The period of sickness may not be easily defined but it may be taken as the length of time when the range of his activities become so restricted as to prevent him from performing essential duties. The period of sickness should be marked on the diagram referred to in 4 above by horizontal lines. The line for each sickness should be identifiable.

16. This refers to the visits paid by the appropriate staff of the Public Health Department.

17. If the person has suffered for more than two diseases during the year circle 12 of column No. 31 and enter particulars for the third disease in the space provided. No column numbers are given, because this information is not intended to be analysed mechanically.

18. Contact during the last 3 months prior to date on the schedule only to be recorded.

19. Close if he attends on the patient or stays in the same house.

20. The system of marking height correct to  $\frac{1}{2}$ " and of weights correct to 1 lb. follows the principle enumerated in connection with age. In either case both the group column and the subdivision column should be circled. Thus if in the case of height No. 6 in the group column and no. 1 in the subdivision column are circled the value is 29 0, that is to say it is 29 0 or within  $\frac{1}{2}$  inch more than 29.

Similarly in the case of weights when No. 10 in the group column and No. 5 in the subdivision column are marked the value is 47 pounds or up to a lb. more.

21. Use flotation cover-slip method.

22. Examine both thick and thin films.

## ALL INDIA INSTITUTE OF HYGIENE & PUBLIC HEALTH

### List of diseases for "Causes of Death" and "Sickness."

Int. Code No.	Int. Code No.	Name of the Disease.	Int. Code No.	Int. Code No.	Notes on Disease.
1	16-19, 19-198	Accidental deaths other than suicide and alcohol life	22	20-22	Fever, Chills.
2		Acute abdomen	23	12	Flukes, etc.
3	20	Acute anterior Poliomyelitis	24	20-25	Heart diseases.
4	10	Ankylospondylitis	25	21	Influenza with or without respiratory complications.
5	71, 72	Anthrax (N)	26	20	Kala-Azar.
6	161a	Asphyxia Neonatorum.	27	23	Leprosy.
7	68	Beri-beri	28	121-7	Liver diseases, (Cirrhosis, other diseases of liver, Bile Calculi & Gallbladder disease).
8	160	Birth injury.			
9	28	Black water fever.	29	28	Malaria. (All types).
10	45-55	Cancer and Malignant tumours.	30	35	Measles (N).
11	88	Cataract.	31	6	Meningitis (N). (Cerebro-spinal).
12	38	Chicken Pox. (N).	32	81	Mental disorder.
13	1	Cholera. (N).	33		Miscellaneous.
14	157, 158	Congenital debility malformations, etc.	34	11c	Mumps. (N).
15	381	Dengue.	35	130-2	Nephritis & other disease of urinary system.
16	61	Diabetes.	36	80-3, 85-7	Nervous system — Other diseases of.
17	27	Diarrhoeas & Dysentery. (N). Amoebic bacillary others.	37	25	Ophthalmia Neonatorum.
18	11c	Diphtheria. (N).	38	3	Plague (N). (Bubonic, septicaemic and pneumonic).
19	80	Ear diseases & Middle Ear.	39	107, 108, 109	Pneumonia. (N). (Broncho-pneumonia, Lobar Pneumonia Unspecified).
20	206-2	Epidemic Dropsy.			
21	88	Eye other diseases of.			

*List of disease for "Causes of Death" and Sickness—contd.*

Institute Code Nos.	International Code Nos.	Name of the Disease.	Institute Code Nos.	International Code Nos.	Name of the Disease.
40	77-9	Poisoning, (Alcoholism, others).	65	5	Undulant Fever.
41	140 144, 147-8, 142-3, 145 146, 149, 150.	Pregnancy & Childbirth diseases of.	66	82	Yaws.
42	150	Prematurity.	67	42	Other diseases due to Helminths.
43	147b	Puerperal fevers.	69	7, 11, 24, 20, 37, 44.	Other infective parasitic diseases (Specify).
44	38b	Rabies.	69	50	Non-malignant tumours.
45	31	Relapsing fever. (N).	70	57	Tumours of undetermined nature
46	58, 59	Rheumatic conditions.	71	62-60	Diseases of endocrine glands.
47	154-156	Rickets (Diseases of the bones).	72	67	Scurvy.
48	151-3	Scabies.	73	69	Pellagra.
49	162	Senility.	74	71	Other vitamin deficiency diseases.
50	151-3	Skin—Other diseases of.	75	78	Anemias.
51	84	Small-pox (N).	76	96-103	Other diseases of Circulatory System.
52	169-98	Snake-bite & bites of other wild animals.	77	106	Bronchitis.
53	72, 74, 76	Spleen & blood—disease of.	78	104, 105, 110-114.	Other respiratory disease.
54	163, 164	Suicide.	79	117	Ulcer of the Stomach or Duodenum.
55	12	Tetanus.	80	110, 120	Enteritis and Diarrhoea.
56	1150(1,2 or 3),	Throat diseases including tonsillitis.	81	121	Appendicitis.
57	88	Trachoma.	82	112	Hernia.
58	13	Tuberculosis of respiratory system. (N).	82	115, 116, 118, 123, 128-0.	Other diseases of the digestive system.
59	14-22	Tuberculosis other than respiratory. (N).	84	183-9	Nonvenereal diseases of the genito-urinary system.
60	1 & 2	Typhoid & paratyphoid fevers (N)—Specify.	85	165-8	Homicide.
61	30	Typhus fevers (N).	86	169-98	Other external causes (Nature to specify).
62	30	Veneral diseases.	87	19 9,200	Other illdefined causes.
63	9	Whooping cough.			
64	112	Asthma.			

## KEY TO THE NUTRITIONAL ASSESSMENT SCHEDULE:

**Eyes.****(a) Conjunctiva—****(1) Moist or dry (A).**

- 0—Normal Glistening with a certain amount of moisture.
- 1—Slightly dry.
- 2—Conjunctiva dry and even getting wrinkled.
- 3—Conjunctiva very dry going even to xerophthalmia and Bitot's Spot.

**(2) Discolouration (A).**

- 0—Normal colour.
- 1—Slight discolouration of palpebral opening.
- 2—Moderate browning of the whole conjunctiva.
- 3—Severe degree of discolouration different from jaundice. Earthy colour

**(3) Discharge (A).**

- 0—No discharge.
- 1—Slight increase in moisture—watering of eyes.
- 2—Slight mucopurulent discharge at the inner canthus.
- 3—Purulent discharge at the inner and outer canthus as well as along palpebra.

**(b) Cornea—****(1) Moist or dry (A).**

- 0—Normal.
- 1—Slight dryness and diminished sensibility.
- 2—General haziness and diminished transparency.
- 3—Stage of ulceration.

**(2) Corneal Vascularisation (B2—Riboflavin).**

- 0—No vascularisation.
- 1—Vascularisation appearing in sclero-corneal junction.
- 2—Circum corneal injection.
- 3—Keratitis or iritis following vascularisation.

**(c) Angle of the eyes—****(1) Excoriation (B<sub>2</sub>—Riboflavin).**

- 0—Nil.
- 1—Slight excoriation.
- 2—Apparent excoriation.
- 3—Frankly excoriated.

**(d) Functional defects—****(1) Night blindness (A).**

- 0—Nil.
- 1—Slight difficulty at night (cannot undertake finer work).
- 2—Moves only with great difficulty.
- 3—Cannot move at night without assistance.

*N.B.*—Exclude other eye diseases not associated with nutritional defects.

**(2) Photophobia (A & B<sub>2</sub>—Riboflavin).**

- 0—Nil. 1, 2, & 3—Presence of photophobia of different grades.

**Nose.****(1) Mucous membrane (A).**

- 0—Moist normal.
- 1 & 2—Different degrees of dryness.
- 3—Chronic atrophic rhinitis.

**(2) Discharge (A).**

- 0—Nil.
- 1—Watery discharge.
- 2—Mucopurulent.
- 3—Purulent.

**Mouth.****(a) Lips Condition. (B<sub>2</sub>—Riboflavin)—**

- 0—Normal.
- 1—Dry and cracked.
- 2—Angular stomatitis superficial.
- 3—Angular stomatitis more extended.

**(2) Tongue.****(a) Physical condition—(i) Size—(B<sub>2</sub>—Riboflavin).**

- 0—Normal.
- 1—Slightly swollen.
- 2—Swollen and indented.
- 3—Swelling with glossitis of tip and margin.

**(ii) Colour (B<sub>2</sub> & C).**

- 0—Normal.
- 1—Pale.
- 2—Red.
- 3—Red and raw.

**(iii) Surface (B<sub>2</sub> & C).**

- 0—Normal.
- 1—Fissured.
- 2—Ulceration.
- 3—Smooth and glossy (papillae lost).

**(b) Edge (B<sub>2</sub>—Nicotinic acid)—**

- 0—Normal.
- 1—Slight denudation.
- 2—Denuded.
- 3—Ulcerated edge with salivation and stomatitis.

**(3) Gum and Mucous membrane.****(a) Condition (C)—**

- 0—Normal.
- 1—Bleeding on pressure (Spongy).
- 2—Frankly bleeding.
- 3—Bleeding & gingivitis and/or pyorrhoea.

**(4) Teeth.****Time of dentition (D) (for babies of 9 months and above)—**

- 0—Within 9 months.
- 1—Within one year.
- 2—Within 1½ year.
- 3—Within 2 years and after and other abnormalities.

**Condition (A, C & D)—**

- 0—Normal.
- 1—Chalky appearance with ridges in the teeth.
- 2—Caries.
- 3—Destroyed by caries completely.

**Condition (A).**

Atrophy of enamel and defective dentine—  
partly explaining pyorrhoea and even caries.

**Condition (C).**

Associated with spongy gums.

**Throat.****(a) Condition (A)—**

- 0—Normal.
- 1—Enlarged up to pillars of fauces.
- 2—Enlarged beyond the pillars of fauces.
- 3—Enlarged and crypts with infections and secondary effects (Involvement of glands).

**(b) Adenoids; Presence (A)—**

- 0—Absent.
- 1—Enlarged slight.
- 2—Moderate enlargement.
- 3—Enlargement—adenitis leading to mouth breathing.



**Throat—contd.**

- (c) Voice : *Timbre*—(Vitamin A deficiency—hormonal [or ductless gland deficiency])  
 0—Normal.  
 1—Change of normal tone.  
 2—Dry and hacking.  
 3—Broken and hoarse. }

**Ear.**

- Discharge (A)*—  
 0—No discharge.  
 1—Mucus discharge.  
 2—Mucopurulent discharge.  
 3—Purulent discharge (chronic).<sub>2</sub>

**Hair.**

- (a) Quantity (A)—  
 0—Normal.  
 1—Thin.  
 2—Very thin.  
 3—Baldness.  
 (b) Appearance (A)—  
 0—Normal lustre.  
 1—Slight loss of lustre.  
 2—Discoloured.  
 3—Discoloured and dry.  
 (c) Quality (A)—  
 0—Normal.  
 1—Brittle (slight).  
 2—Brittle.  
 3—Split.

**Skin.**

- (a) General appearance : (A)—  
 0—Normal lustre.  
 1—Loss of lustre.  
 2—Dry and rough.  
 3—Hyperkeratosis, phrenoderma.  
 (b) *Elasticity* : (A)—  
 0—Normal.  
 1—Diminished elasticity.  
 2—Just wrinkled.  
 3—Wrinkles and folding.  
 (c) On face : (B<sub>2</sub>—Nicotinic acid)—  
 0—Normal lustre.  
 1—Dryness and cracking.  
 2—Bisymmetrical pigmented patches or butterfly patches.  
 3—Pigmented or butterfly patches and excoriation.  
 (d) On upper limb : (A and B<sub>2</sub>—Nicotinic acid)—  
 0—Normal.  
 1—Bisymmetrical dermatitis.  
 2—Bisymmetrical dermatitis with thickening and pigmentation.  
 3—Phrenoderma. (toad-skin).  
 (e) On the lower limb : (A and B<sub>2</sub>—Nicotinic acid)—  
 0—Normal.  
 1—Bisymmetrical dermatitis.  
 2—Bisymmetrical dermatitis with thickening and pigmentation.  
 3—Phrenoderma. (toad-skin).  
 (f) On trunk—(A and B<sub>2</sub>—Nicotinic acid)—  
 0—Normal.  
 1—Bisymmetrical dermatitis.  
 2—Collar like pigmentation and dermatitis around the neck—bisymmetrical (Casal's necklace).  
 3—Phrenoderma (toad-skin).  
*Adipose tissue*—(to be judged by the examination of the upper arm).

**Skin—contd.****(a) Deficiency of fat—**

- 0—Normal.
- 1—Slight deficient.
- 2—Deficient.
- 3—Very deficient.

**(b) Deficiency of ductless glands \*(dg)—**

- 0—Normal.
- 1—Slight excess.
- 2—Excess.
- 3—Increased and excessive Frohlich's syndrome.

\*Mention dg if deficiency of ductless gland.

**Oedema ( $B_1$  or Protein deficiency)—**

- 0—No oedema.
- 1—Slight oedema on dependent parts.
- 2—Oedema on face and dependent parts.
- 3—General anasarea (as distinguished from heart and kidney diseases).

**Muscles : strength—**

- 0—Normal strength according to age and sex.
- 1—Weak muscles.
- 2—paresis.
- 3—Paralysis.

**Bones : (C & D)—**

- 0—Normal.
- 1—Slight deformity.
- 2—Enlargement of the ends of the bones and deformity.
- 3—Ricketsy rosary, pigeon breast, bow legs, etc.

**Lungs.****Adventitious sounds (A)—**

- 0—Normal.
- 1—Few rhonchi and rales.
- 2—Moderated amount of rales and rhonchi.
- 3—Chronic bronchitis.

**Circulatory system.****(a) Heart—****(i) Size ( $B_1$ ).**

- 0—Normal.
- 1—Apex just outside the nipple line.
- 2—Moderate enlargement.
- 3—Gross enlargement with symptoms.

**(ii) Rhythm ( $B_1$ ).**

- 0—Normal.
- 1—Arrhythmia.
- 2—Palpitation and irregularity.
- 3—Dropped beats and irregularity.

**(iii) Sound ( $B_1$ ).**

- 0—Normal.
- 1—Haemic murmur slight.
- 2—Haemic murmur definite.
- 3—Definite regurgitation.

**Blood vessels and capillaries.****(a) Resistance (C)—**

- 0—Normal.
- 1—Leaves a faint red mark on scratching for a short while.
- 2—Leaves a definite red mark on scratch.
- 3—Tache cerebrale.

**(b) Anaemia ( $B_2$ )—**

- 0—No anaemia (85 % & above).
- 1—Slight anaemia (70-85%).
- 2—Moderate anaemia (50-70%).
- 3—Gross anaemia (less than 50%).

**N.B.**—Exclude anaemia due to obvious causes, such as recent attack of malaria hookworm,

etc.

**Alimentary System.****Appetite: Anorexia ( $B_1$ )—**

0—Normal.

1—Slight anorexia.

2—Anorexia.

3—Anorexia with nausea or vomiting.

**Bowel movement:**(1) Diarrhoea ( $B_2$ -complex)—

0—Motions 1—2 times.

1—Motions 2—4 times.

2—Motions 4—5 times or sprue like.

3—Motions more than 5 times or definite sprue.

(2) Constipation ( $B_2$ )—

0—Not constipated.

1—Slight constipation (stools hard &amp; once a day or alternate days).

2—Motion once in 2 or 3 days.

3—Motion once in more than 3 days, and sometimes not without laxatives.

**Nervous System.**(1) Deep tenderness ( $B_1$ )—

0—Normal.

1—Slight.

2—moderate.

3—severe.

(2) Sensation ( $B_1$ )—

0—Normal.

1—Slight loss or exaggeration.

2—Paræsthesia or tingling.

3—Pain or loss of sensation.

**General Constitution.****Build—**

0—Expected normal.

1—Lower than expected normal.

2—Poor.

3—Very poor.

**GRADES OF VITAMIN AND MINERAL DEFICIENCIES.**

(Grades—normal, slight, moderate &amp; marked.)

**Vitamin A Deficiency.**

Slight—A score of 1 for a few of the following organs of the body, viz., eyes (conjunctiva, cornea, etc.) ears, nose and throat, hair, skin and lungs.

Moderate—A score of 2 for a few of the above organs and particularly eye, skin and throat.

Marked—A score of 3 for a few of the above organs or even one organ like eye (e.g., Xerophthalmia or Bitot's spot) or skin (e.g., Hyperkeratosis, Phrenoderma, dermatitis, etc.).

NOTE—Any combination of scores of 1, 2 and 3 for different organs, mentioned above indicating in each case a certain clinical state given in the key, may be encountered. In such cases the grade of deficiency should be judged by interpolation.

**Vitamin  $B_1$  Deficiency:**

Slight—A score of 1 for a few of the following system or organs, viz., Bowels (constipation, etc.), Heart (size and rhythm) and nervous system (deep tenderness and sensation) in absence of obvious causes of other known diseases.

Moderate—A score of 2 for a few of the above organs in absence of obvious causes or other known diseases.

Marked—A score of 3 for a few or even one (e.g., oedema or cardiac palpitation dilatation or neuritis) of the organs in absence of obvious causes of other known diseases.

**NOTE.**—Any combination of scores of 1, 2 and 3 for different organs mentioned above indicating in each case a certain clinical state given in the key, may be encountered. In such case the grade of deficiency should be judged by interpolation.

#### **Vitamin B<sub>2</sub> Complex (Riboflavin B<sub>2</sub>) Deficiency.**

**Slight**—A score of 1 for a few of the following organs, *viz.*, eye (appearing corneal vascularisation & excoriation, photophobia), lips, tongue (size, colour, surface) diarrhoea.

**Moderate**—A score of 2 for a few or even one (*e.g.*, corneal vascularisation, excoriation of eye—or angular stomatitis and ulcerated tongue) of the above organs.

**Marked**—A score of 3 for a few or even one of the organs mentioned in case of moderate deficiency.

**NOTE.**—Any combination of scores of 1, 2 and 3 for different organs mentioned above indicating in each case certain clinical state given in the key may be encountered. In such cases, the grade of deficiency should be judged by interpolation.

#### **Vitamin B<sub>2</sub> Complex (Nicotinic acid, B<sub>3</sub>) Deficiency.**

**Slight**—A score of 1 for skin of face and or limbs and trunk and edge of tongue.

**Moderate**—A score of 2 or any combination of 1 and 2 for the above organs.

**Marked**—A score of 3 or any combination of 1, 2 and 3 for the above organs.

#### **Vitamin C Deficiency.**

**Slight**—A score of 1 for colour and surface of tongue, conditions of teeth, bones, blood vessels & capillaries associated with 1 for gum and mucus membrane.

**Moderate**—A score of 1 or 2 for colour and surface of tongue and/or for conditions of teeth, bones, blood vessels & capillaries associated with a score of 2 for gum and mucus membrane.

**Marked**—A score of 1, 2 or 3 for surface and colour of tongue, conditions of teeth, bones and blood vessels & capillaries and a score of 3 for gum and mucus membrane.

#### **Vitamin D Deficiency.**

**Slight**—A score of 1 for teeth (time of dentition and condition) and bones.

**Moderate**—A score of 2 for the above organs.

**Marked**—A score of 3 or of any combination of 1, 2 and 3 of the above organs.

#### **Fe Deficiency.**

**Slight**—A score of 1 for anaemia and heart sound.

**Moderate**—A score of 3 or of any combination of 1, 2 and 3 for anaemia and heart sound.

#### **General Constitution.**

Grades based on height, weight and general-built (Exclude conditions due to immediate acute or chronic illness and probable genetic origin).

## KEY TO ADDENDUM FOR SCHOOL CHILD.

1. In case of children not residing within the boundaries of the "Health Centre" but attending school located in the centre give name instead of serial No., name of the head of the family instead of Family No., and name of the village and Union Board in place of their code number.

2. Note exact number of years in case of children under 5 and 15 years of age.

3. Note the name of the village, also if the school is located outside the "Health Centre" area.

4. Due to infectious diseases, as given in this addendum, in No. of days.

5. (a) Knowledge of germ theory—take typhoid or any other common diseases for questioning.

(b) Take fly or mosquito as example, enquire about life history and diseases carried.

(c) Ascertain knowledge regarding measures for prevention of contamination of water and protection from flies.

(d) Well management.

(e) Advantage of milk as food for growing children.

(f) Advantages of exercise in oxygenation of blood and development of muscles and bones.

NOTE.—The assessment is in terms of Yes & No., according to the judgement of the investigator who should pay special attention to essential knowledge in relation to health without caring for actual details. Thus for instance in regard to life history of mosquito the essential knowledge is that it breeds in water and that as a rule mosquitoes breeding in dirty waters are not malaria carriers.

6. (a) Regularity of evacuation habits.

(b) Using brush, paste, powder or other means for cleaning teeth.

(c) Bath—usually daily and daily change of clothes.

(d) Regularity.

(e) Outdoor games at least 2 hours a day.

(f) Correct posture and direction and intensity of light.

(g) Clean or not.

(h) Combing of hair, wearing clothes properly.

(i) Satisfactory or unsatisfactory.

(j) Yes or No.

(k) Yes or No.

7. Note the activity in which the child takes part.

## ALL INDIA INSTITUTE OF HYGIENE &amp; PUBLIC HEALTH, CALCUTTA.

## FIRST SURVEY SINGUR HEALTH CENTRE.

*Key to Patient's Schedule.*

1. Note nature and duration, note also the date of first symptom.
2. Note dates and chief features : for the most recent illness and two previous to that.
3. Note whether ambulatory or in bed, degree of prostration and facies.
4. Respiration : number, type.
5. Pulse rate—regularity, tension, nature.
6. Normal, if abnormal note abnormalities.
7. Heart—cardiac abnormality—apex heat, precordial, dulness, bruit, response to exercise, others.
8. Abdomen symptoms—reflexes, gas, fluid, liver, spleen, stomach, colon, other viscera.
9. Abnormalities.
10. Reflexes (knee jerk, etc.), Grip abnormalities.
11. Abnormalities.
12. Stools—note daily motions, character accompanying pain. Result of laboratory examination.
13. Vomit—note number, character with or without wrenching, result of laboratory examination.
14. Character—quantity and nature of sputum, laboratory result.
15. Urine—rough quantity, abnormal constituents.

## ALL INDIA INSTITUTE OF HYGIENE &amp; PUBLIC HEALTH, CALCUTTA.

## FIRST SURVEY SINGUR HEALTH CENTRE.

*Key to the Home Visiting Schedule in connection with cases of infectious diseases.*

1. This is meant for identification of the case and fixation of responsibility. It, therefore, includes manager of hotel, Superintendent of hostel, etc.
2. This information gives further idea of responsibility towards the patient.
3. In multiple cases in the family or establishment, add a number before the name to denote chronological order of the case.
4. In some cases the first symptoms may be indefinite or the patient may not connect them with the present illness. In such cases information regarding the specific symptoms which are known to be associated with the disease should be elicited. A correct estimate of the time when the first symptoms commenced is important both in finding out the source of infection and in making out the contacts of the present case.
5. This information is also useful in working out the contacts.
6. This is obtained from the clinical schedule. State whether the diagnosis is probable, reasonably certain or definite.
7. This may also be obtained from patients' schedule.
8. For this purpose obtain a list of notifiable diseases in the administrative area.
9. Although second attacks, in some diseases cannot be altogether excluded, they are very unlikely to occur. Every attempt should be made to ascertain whether the previous attack was of an allied disease as for instance a paratyphoid when dealing with a typhoid case.
10. State number of doses received and information about the source and nature of the vaccine employed. In case the expected reaction did not occur, the fact should be noted. Vaccination marks, their number, extent and location should be mentioned in smallpox cases.
11. Considerable amount of patience and tact is required for eliciting this information in some cases. Sometimes the obvious source of infection is not the real source.
12. This term should include animal sources.
13. For most diseases a period of one month will suffice, but in diseases of longer or shorter incubation periods it may be decreased or extended accordingly. This applies to food, drink, fruits and visitors.
14. History of contact and disease should be elicited. State whether probable, recently certain or definite, if the person is marked as infectious.
15. Note probable, reasonably certain or definite, together with the evidence on which the opinion is based. While every effort should be made to ascertain the infectiousness of these articles, one should hesitate to state unknown if no information on which an opinion can be based is elicited.
16. State 'yes' if all meals are regularly taken at home.
17. This information relates to meals taken out by those otherwise taking food at fixed places. Picnicks, feasts, etc., are of importance and in such cases information about the state of health of those who shared the food should be obtained.
18. State place and inquire into any sickness amongst those eating at the same place.
19. Should include anything eaten without fresh cooking, e.g. in cream, bread, etc.
20. Appropriate information regarding breeding and measures taken to control and to prevent vermin of disease etc., in case of carriers of the disease, is to be obtained and recorded.
21. Infectiousness of the patient in relation to the stage of disease varies greatly in different diseases. Those informations are of great value in tracing contacts.
22. Particular attention should be paid to the type of W.C. or privy and the way it is worked. Adequacy or otherwise of protections from flies should be noted. Attention should also be paid to kitchen, garbage collection, etc. Living accommodation, sleeping rooms, etc., should also be inspected and appropriate notes made.

23. It is not possible to set standards of cleanliness but a qualified doctor ought to be able to form a judgement according to a more or less agreed but unwritten standard for such abodes. Note what improvements, if any, can be made and how they could be affected.

24. The nature and degree of isolation required varies with diseases. Taking this fact into consideration a judgement should be formed as to whether it is satisfactory, possible or unsatisfactory. In latter case statement should be made as to whether improvement can be affected under the circumstances, the difficulties, if any should be noted and recommendations made.

25. This is a matter of greatest importance and a great deal can be done even in the lowliest houses. Note should also be made if disinfectant is used and whether or not it is satisfactory. The means of affecting improvement should be investigated and recommendations made.

26. State whether sufficient care was being taken by the attendants to avoid carrying infection to other members of the family or outsiders. In case of relation attendants note specially if he or she is cooking or handling other people's food in the house or outsiders. For professional nurses note whether qualified or not.

27. This information is required to estimate susceptible contacts and to ascertain what, if any precautions are being taken to protect them. Recommendations for further measures should be made. In case of smallpox special mention should be made of vaccination of contacts and for this purpose a note regarding experimental contact should be inserted.

28. Note should also be made of the attempt on the part of the health authorities for ascertainment.

29. This is partially covered by collection and disposal of excremental matter and of utensils. Any extra information available should be noted.

30. Mention should be made whether adequate means have been taken or can be taken and whether municipal facilities are available for the purpose. If concurrent disinfection and proper nursing have been adopted terminal disinfection is of little value.

31. This is to include additional preventive measures adapted or possible which have not already been stated. Make your recommendations.

32. Ignorance is a relative term both with regard to degree and kind. Sometimes otherwise well-informed persons are ignorant of aetiology of certain diseases and to that extent they belong to almost the same category as others, in respect to that disease.

33. By responsiveness is meant an estimate of willingness to give the required information, to accept the advice tendered and to attempt action on the lines suggested or agreed.

34. This information should be of value in organising campaign against the disease.



## ALL INDIA INSTITUTE OF HYGIENE &amp; PUBLIC HEALTH CALCUTTA.

## FIRST SURVEY SINGUR HEALTH CENTRE.

*Key to the family schedule.*

7) Family is defined as a unit having a common kitchen. Note whether the family is single, joint or multi. A family will be considered single when it consists of husband, wife and minors; joint, if it consists besides these, of some other members closely related to each other and multi, when there are some members unrelated or not closely related.

Human action, whether in response to external stimuli or activated from within is determined by a number of complicated factors and processes and any accurate analysis of a man's behaviour is hardly possible in a general survey. When it is desired to ascertain the behaviour of a group of individuals constituting a family, the problem becomes still more complicated. However, to make any headway with a social programme it is of utmost importance to probe, even though superficially, into their psychology. The items noted in the schedule are of a restricted nature and it is hoped that by a series of tactfully directed questions the investigator would be able to form a fair judgement of the likely family behaviour in some of the important health matters. It is only intended to note the predominant disposition as no one is purely rational or otherwise.

*Food.*—Man usually selects by the process of trial and error extending over generations the right type of food available in his circumstances. Just as science has progressively extended the choice of available food, it has also provided an intelligent guide in satisfying physiological needs. This knowledge is essentially simple and should be easily disseminated but in regard to behaviour his habit, custom, tradition and prejudices come in the way. At any rate the investigator should be able to judge whether the light of newer knowledge of nutrition is beginning to enlighten thought and behaviour in supersession of tradition and prejudice. Thus for instance a man with knowledge may not select the correct article of food when both the right and the wrong types of food are available or they could be hypothetically made available. Actual examples will readily suggest themselves to an intelligent investigator going through the food habits of a community.

*Prevention and cure of disease.*—The general remarks made in connection with food also apply to the present item but the classification is perhaps simpler and easier because of the historical evolution of epidemiological thought. Difficulty might be experienced on account of greater diversity amongst the ideas of members of a family or in respect of different diseases. In any case the general conclusion as regards the probable ideas and behaviour of the family as a unit in respect of two or three common diseases may be noted.

*Community Sense.*—It is generally believed with some justification that we in this country suffer from lack of community sense whatever our individual merits may be. This is frequently illustrated in internal cleanliness of huts and insanitary condition of the surroundings. It is so forgotten that in matters of communicable diseases at any rate, the welfare of the neighbour is as essential as one's own if sickness is to be reduced to the minimum. Besides the example given information about the various social activities of the community may be gathered, to help in formulating an opinion.

From the point of social welfare we are essentially interested in two aspects of family budget, viz., (a) the level of expenditure on food and other articles of consumption and (b) economic stability of the family, i.e., whether the stated level of expenditure can be maintained or improved or otherwise. In calculating the index of prosperity, therefore first classify the families with regard to *per capita* expenditure on the consumption side. Note three graphs representing roughly the upper, the middle and the lower thirds of the population and then subdivide each grade with five groups according to the stability of their position. This is determined by the sign and amount of the balance between average income and expenditure in relation to the average income. Group A represents family with a credit balance of 15 per cent. or more, Group B represents families with a credit balance of 5 to 15 per cent. In the Group C are included the families with a credit or debit balance to the extent of 5 per cent. of their income. D and E groups represent families upto 15 per cent. and above debit balance respectively.

It has been the general experience that for various reasons people are very shy about giving the details of their income. This is particularly so with rural population. A right approach to obtaining information about income is necessary if even approximately correct data are to be collected. The usual sources of income are sale or use of marketable commodities, wages in cash or kind income from profession or service, income from business, income from property, interest on loans and consideration in cash or kind for religious and their performances. The total income of the family should include the contributions received from members of the family carrying on business or serving outside the village. Keeping those items in mind one should carefully frame his questions to gather the information. The reason why the items of income do not appear in the schedule is to avoid direct questioning which antagonises the person concerned.

# ALL INDIA INSTITUTE OF HYGIENE & PUBLIC HEALTH; CALCUTTA.

## FIRST SURVEY SINGUR HEALTH CENTRE.

### *Key to the Sanitary Assessment of house.*

1. This does not include infants, the number should be stated separately in brackets.
2. Children include persons up to 10 years of age including infants.
3. Does not include the cost of land.
4. Passage on which vehicular traffic is carried on.
5. Good if it efficiently serves its purpose during heavy rain, fair if it does so within an hour of heavy rain and bad if it fails to do so during the rains and at other times.
6. For side and rear spaces the width is to be measured only if ventilation is obtained on that side. Do not make any entries but put a cross mark if no window is placed on a side.
7. Small, such as, cowdung cake or small collection of refuse; medium size, such as latrines, refuse deposits and other rotting materials; large, such as single manure heap extensive, when the area includes manure heaps, stables and piggeries.
8. Weedy—up to 500 sq. ft; rank vegetation—1,000sq.ft.; jungle—more than 1,000 sq. ft.
9. Good—if water is removed within 15 minutes after heavy rains; inadequate—if the water is removed within half an hour or so; poor—if it takes long time to drain or remains water-logged; not drained—when it remains under water during heavy rains.
10. For calculation of average space per person ignore infants and count a child as a half person.
11. On entering in the early morning ventilation is good if air is fresh; inadequate if not quite fresh and poor if actually uncomfortable (check it up with Ktathermometer).
12. Adequate, if on a clear day one hour after sunrise or one hour before sun set a news paper like the "Statesman" can be easily read in a corner remotest from openings; it is inadequate if it can be read only in certain parts of the room and poor if cannot be read easily.
13. Flooding of floor relates to normal rainy season and is to be obtained by enquiries and partially judged from observations.
14. The premises are clean when there is no rubbish, things are arranged in orderly manner floor and walls are rendered with suitable material and dusting and sweeping are done regularly once or twice a day. They are moderately clean when a lower standard of the above requirements are achieved; dirty when putrescible matter is lying about which include discharge from bowels, nose and throat.
15. Look for rat holes and tracks.
16. Relates to materials and condition of repair.
17. For putrescible material bear in mind the materials from kitchens, baths, etc.
18. When there is no stagnation the drain satisfactory.
19. Storage or availability of water sufficient in case of fire. Take into consideration the material of construction and the environment.
20. Controlled when the droppings are not seen in the rooms.

## ALL-INDIA INSTITUTE OF HYGIENE &amp; PUBLIC HEALTH, CALCUTTA.

## KEY TO SCHOOL SURVEY SCHEDULE.

1. Note session.
2. Name of school.
3. Tile, tin, thatch or concrete.
4. Mud, cement, brick or stone.
5. Mud, brick, tin or mud and bamboos.
6. Yes or no.
7. Good, fair or bad.
8. Adequate, inadequate or nil.
9. Adequate or inadequate. It is adequate when the ratio of window area to floor space is 1 : 8 or more and the light comes from the left and back or scholar's shoulder.
10. Adequate or inadequate. It is just adequate when dry kata cooling power is 3.4 and wet kata cooling power is 8.2.
11. Adequate or inadequate. It is adequate when there is at least 12 sq. ft. of space per scholar.
12. Proper type or not. They are proper type when the seat is 2/7th the height of the child. Note whether state of repair good, fair or bad.
13. Proper type or not. They are proper type when the height of the desk is 3/7th to child's height and the edge of the desk is 2" above the legs of the child. Note their state of repairs—good, fair or bad.
14. Satisfactory, or not i.e., the matter written on the board is satisfactorily visible from all parts of room or not. Note also the state of repairs—good, fair or bad.
- 14a. Note the distance.
15. Adequate, not adequate or absent. It is adequate if there is 1 latrine per 70 boys. Standard may be reduced to 1 per 100 boys if separate urinal accommodation is provided at the rate of 10 per 100 children. In case of girls there should be 1 latrine for 30.
16. State whether they are properly maintained as regards cleanliness repair and supervision.
17. Yes or no. It is safe if unboiled water is inaccessible to children for drinking purposes. Water from deep protected tube-wells is also safe.
18. Satisfactory, unsatisfactory or nil. It is satisfactory if the vessel is regularly cleansed and the distribution is through a pipe, no one being allowed to dip a cup, etc., to obtain water.
19. Adequate or not. It is not possible to lay down any standard but local enquiry will elicit the required information.
20. Note present or absent.
21. Investigator shall judge for himself if he considers disposal satisfactory or not in view of the instructions received from Professor of Sanitary Engineering.
22. Adequate, inadequate or nil. It is adequate if there is 7.6 sq. yd. of space provided per scholar.
23. Satisfactory or not.

# ALL INDIA INSTITUTE OF HYGIENE & PUBLIC HEALTH, CALCUTTA.

## KEY TO SCHEDULE FOR SANITARY SURVEY OF THE VILLAGE.

(a) Communications good if railway station, main road, water way, post and telegraph office is within  $\frac{1}{2}$  mile from any part of the village; fair if within 2 miles from any part of the village; poor otherwise.

Good by footpath if the footpath goes to the village and is fit for occasional cart traffic, fair if the path goes to the village but cannot be used by carts under any circumstance.

(b) For Built-up area: Approximate estimate will be sufficient, Classify good, fair or poor according as the percentage of build-up area to total area is less than 40 per cent. less than 50 per cent., or over respectively.

(c) Make an approximate estimate of area for parks and playgrounds. Classify good or fair according as the percentage to total exceeds 15 or 10 and poor if it is less than 10 per cent.

(d) Roads to be considered wide if the width is not less than the heights of the building abutting thereon.

(e) Ribbon development is development only along the edges of a long road.

(f) P stands for protected and U stands for unprotected. Note the number under each category in the space provided.

(g) Satisfactory if there are tube wells, wells or taps to supply drinking water at the rate of at least 1 per 80 people; fair if they are enough to supply drinking water at the rate of at least 1 per 400 people; poor otherwise.

(h) Satisfactory if 90 per cent. of the public and private wells are protected; fair if 70 per cent. of them are protected; poor otherwise.

(i) Tenement houses are attached houses of the poorer classes generally built in uniform style.

(j) Good markets and provision shops to be judged by cleanliness and adequacy of supplies of vegetables, fruits, eggs, fish, meat, oils, and grains.

(k) Lodging houses include *Dharamshallas* that are well-maintained.

(l) Refer to the house schedule and note the number of houses and cowsheds where breeding is present.

(m) Refer to the table for larvas collection and give the number of breeding places under different heads. Also mark on the village map the different breeding places according to the following scheme:

Permanent actual (+)

Permanent potential (—)

Temporary actual (0)

Temporary potential (x)

Add P, T, D. etc., after according as pond, tank, doba, etc.

(n) State the first compilation authority and interval between dates of submission.

(o) Only those which cause nuisance of smoke, odour or noise or pollute streams or ground water to be considered. Note the distance from the village in miles.

(p) Growth of population normal if the rate of increase is within 1 per mille of the rate for the province during the last census. This may not be easy to ascertain, if so, make no remarks.

## APPENDIX 'III' (a) AND (b) (P. 267)

(a) Mean monthly maximum and minimum temperature at Singur during 1943.

(b) Monthly rainfall at Singur, 1941-44.

## APPENDIX III.

(a)

*Mean monthly maximum and minimum Temperatures at Singur during 1943.*

Month.	Average maximum temperature.	Average minimum temperature.
January . . . . .	58.9	55.5
February . . . . .	56.5	52.9
March . . . . .	70.8	66.0
April . . . . .	77.3	72.4
May . . . . .	96.7	78.0
June . . . . .	92.1	77.4
July . . . . .	86.6	77.0
August . . . . .	88.4	77.1
September . . . . .	88.0	76.6
October . . . . .	89.7	72.4
November . . . . .	85.3	65.8
December . . . . .	80.7	54.1

(b)

*Monthly Rainfall at Singur 1941-1944.*

Months.	Rainfall in inches.			
	1941.	1942.	1943.	1944.
January . . . . .	1.49	nil	1.62	3.36
February . . . . .	nil	0.27	1.42	0.79
March . . . . .	nil	0.26	0.75	1.73
April . . . . .	2.34	0.92	0.73	1.17
May . . . . .	2.61	2.23	1.37	2.75
June . . . . .	18.49	2.91	9.75	3.45
July . . . . .	23.18	9.15	17.7	12.24
August . . . . .	18.67	10.97	12.67	12.68
September . . . . .	9.7	12.4	4.9	8.7
October . . . . .	6.61	7.24	4.25	3.56
November . . . . .	5.42	0.05	nil	nil
December . . . . .	nil	nil	nil	nil
TOTAL . . . . .	88.53	46.60	64.16	50.43

## APPENDIX (IV.) (PP. 270—271).

(a) Bengal Village Chowkidar's Hath-Chitha of Births.

(b) Bengal Village Chowkidar's Hath-Chitha of Deaths.

## APPENDIX 'V'—(PP. 268-269 and 272—275).

(a) Bengal Nutrition Committee's Recommendations of physiologically adequate food requirements.

(b) Approximate nutritive values of certain common foods of Bengal.

## APPENDIX (V) (a).

## NUTRITION COMMITTEE, SANITARY BOARD, GOVERNMENT OF BENGAL.

*Physiologically Adequate Food Requirements 1944.*1. *Basic Caloric Requirements—*

<i>Infants</i>	Calories per day
1 month . . . . .	500
2 months . . . . .	600
4 months . . . . .	700
6 months . . . . .	850
12 months . . . . .	1,000
<i>Children—</i>	
1 to 2 years . . . . .	1,100
2 to 3 years . . . . .	1,200
3 to 5 years . . . . .	1,400
5 to 7 years . . . . .	1,500
7 to 9 years . . . . .	1,700
9 to 11 years . . . . .	1,950
11 to 12 years . . . . .	2,200
12 and upwards . . . . .	2,400
<i>Adults—</i>	
16 to 25 years . . . . .	2,500
Pregnant woman . . . . .	2,600
Nursing Mothers . . . . .	3,000

2. *Additional Caloric Requirements—*(a) *By Nature of work. (for adults)*

Nature of work.	Calories required per hour of work.	Examples.
Light work . . . . .	0—75	Domestic work clerical work tailoring work.
Moderate work . . . . .	75—150	Agricultural work.
Heavy work . . . . .	150—300	Sawing work.
Very heavy work . . . . .	300—400	Sports, digging earth.

(b) *By Age*

Age	Calories required per hour of work.	
	<i>Girls</i>	<i>Boys.</i>
7—11 . . . . .	100	100
11—15 . . . . .	100	200

A normal boy of about 15 expends approximately 3,000 to 3,500 calories.

3. *Protein Requirements—*

Age	Grams per Kg. of body weight.
0—1 . . . . .	5.0
1—3 . . . . .	4.5
3—5 . . . . .	3.0
5—7 . . . . .	2.5
7—10 . . . . .	2.0
10—12 . . . . .	1.8
12—15 . . . . .	2.0
15—18 . . . . .	2.2
18—21 . . . . .	1.5
Pregnant woman . . . . .	1.5 (first 3 months)
Nursing mothers . . . . .	2.9 (4 to 9 months.)
	2.5

4. *Fat Requirements.* The amount of fat required per day recommended is 60-75-grams of which 50 per cent to be of animal origin.

5. *Mineral Requirements.*

	Ca (gm)	P (gm)	Fe (mg)
Children . . . . .	1.0	1.25	12.5
Adult men . . . . .	.75	1.0	10.0
Adult women . . . . .	0.75	1.0	12.5
Pregnant women . . . . .	1.5	1.75	15.0
Nursing mothers . . . . .	1.5	1.75	15.0

6. *Vitamin Requirements.*

	Normal Adults.	Children pregnant women & nursing mothers.
Caroteno (Pro-Vitamin) A . . . . .	2.0 mgms.	3.0 mgms.
B-ioninol (Vit. A) . . . . .	1.0 mgms.	1.5 mgms.
Thiamin (Vit. B <sub>1</sub> ) . . . . .	1.0 mg.	1.5 mgms.
Riboflavin (Vit. B <sub>2</sub> ) . . . . .	1.0 mg.	2.0 mgms.
Nicotinic acid (P.P.) factor . . . . .	10.0 mg.	25.0 mg.
Ascorbic acid (Vit. C) . . . . .	50.00 mg.	50.00 mg.
Calciferol & other (D Vitamins) . . . . .	12 ug	25 ug



APPENDIX IV (a).  
Bengal Village Chowkidar's Hath-Chilla of Births.

Date of Birth.	Name of Village.	Live birth or Still birth.	Male or Female.	Class	Name and addresses of child's Father and Grandfather.	* Age of mother.	* Parity.	Name and Address of local guardian.	Name of reporter.	Number of entry in the thana (Union Board or chowkidari union) register.

\* These two columns have been newly added.

## APPENDIX IV (b).

*Bengal Village Chowkidar's Huk-Chilka of Deaths.*

(Still births are also to be included).

Date of death.	Names of the deceased and his or her father and in case of married woman—name of the husband and class.	Age.	Sex.	Cause of death.			Cause of death.	Number of entry in the <i>thana</i> (Union Board or Chowkidari Union) register.
				Women between 12-50 years.*				
				Was she Pregnant.?	Is childbirth the cause of death.	Did the death take place within 4 weeks of delivery or abortion.?		

\* These three columns have been newly added.

**APPENDIX (V) (b).**  
*Approximate Nutritive values of certain common foods of Bengal.*  
 (On one chatak-about 2 oz.)

Name of food.	Protein g.		Fat g.	Carbo-hydrate g.	Calo-ries.	Calcium mgm.	Phosphorus g.		Iron mgm.		Caro-tene & Vit. A ug.	Vit. B <sub>1</sub> ug.	Vit. C. mgm.	Riboflav-ug.	Nicotinic acid mgm.
	Anim.	Veg.					Total.	Average.	Total.	Average.					
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>I. Cereals.</b>															
1. Barley . . . . .	..	4.5	0.6	37.6	183	16	112	40	1.0	0.8	..	175	..	60	2.2
2. Bread brown . . . . .	..	3.0	3.2	27.0	148	650	103	..	1.5	..	..	37	..	35	..
3. Bread white . . . . .	..	4.6	0.6	26.5	146	25	48	..	0.4	..	..	82	..	..	2.3
4. Rice parboiled, home pounded.	..	4.2	0.3	38.7	180	5	140	..	1.0	0.4	4.5	90	..	..	2.0
5. Rice milled, parboiled.	..	3.2	0.2	30.0	180	5	75	13	0.7	0.2	..	..	..	..	..
6. Rice, polished . . . . .	..	6.0	7.0	25.0	108	..	..	20	..	..	..	..	..	..	2.0
7. Rice, puffed (Khal)	..	3.5	0.2	39.0	176	10	80	..	3.2	0.7	..	105	..	..	..
8. Rice, beaten (Chira)	..	3.3	0.6	39.1	180	10	110	..	3.5	0.7	..	105	..	..	..
9. Rice, parched (Murt)	..	3.6	0.5	31.0	100	..	..	..	2.5	..	..	..	..	..	..
10. Sugo . . . . .	..	0.3	0.1	44.4	182	7	10	..	0.7	..	..	..	..	..	2.5
11. Wheat whole (atta)	..	6.0	0.0	30.0	100	20	100	7	1.5	..	130.2	270	..	20	0.5
12. Wheat flour (malda)	..	5.8	0.7	37.0	180	17	110	..	0.5	..	..	45	..	..	..
<b>II. Pulses and Beans.</b>															
1. Arhar . . . . .	..	10.2	0.6	30.0	174	52	152	..	3.5	..	108.0	225	..	95	2.6
2. Bean, sprouted . . . . .	..	1.4	0.1	1.8	14	10	155	..	1.5	..	..	..	..	..	..
3. Bean, Soya . . . . .	..	10.5	0.5	8.0	260	107	310	145	4.5	3.0	350.0	300	5.5	120	1.2
4. Bengal Gram (Chola).	..	8.5	1.7	30.0	180	110	135	110	5.0	2.0	180.0	150	..	100	1.3
5. Green Gram (Mung)	..	10.0	0.4	30.0	190	70	175	..	2.6	1.0	155.0	219	..	140	0.8
6. Khesi . . . . .	..	12.0	0.5	29.0	202	35	190	..	1.0	..	Tr.	90	..	..	..
7. Lentil (Moshu)	..	12.0	0.6	30.2	170	34	145	..	4.8	1.3	125.0	186	..	157	0.8

**APPENDIX (V) (b).**  
*Approximate Nutritive values of certain common foods of Bengal.*  
 (On one chatak-about 2 oz.)

Name of food.	Protein g.		Fat g.	Carbo- hydrate g.	Calo- ries	Calcium mgm.	Phosphorus mgm.		Iron mgm.		Caro- tens & Vit. A ug.	Vit. B <sub>1</sub> ug.	Vit. C mgm.	Riboflav. ug.	Nicotinic acid mg.
	Anlm.	Veg.					Total.	Average.	Total.	Average.					
<b>I. Rice and Tubers.</b>															
1. Beet root	..	0.8	Tr.	8.0	27	58	24	..	0.7	..	Tr.	105	31	32	..
2. Carrot	..	0.3	Tr.	9.0	18	28	13	..	0.5	..	288.5	90	8	..	..
3. Colocasia (kachu)	..	1.3	0.7	11.0	51	50	48	..	1.0	..	10	120	..	18	0.2
4. Mankachu	..	0.4	..	..	..	10	5	..	..	..	..	30	..	15	..
5. Onion	..	0.5	0.5	4.5	10	12	20	..	0.5	..	13	00	4.4	25	0.2
6. Potato	..	1.0	0.1	9.0	44	27	30	3	0.5	0.3	18	120	11.6	36	0.0
7. Sweet potato	..	0.8	0.1	9.3	43	10	20	..	0.3	..	0.4	18	8.0	20	0.4
8. Radish (mulla)	..	0.4	0.05	2.0	10	23	14	..	0.5	..	1.2	90	7.5	10	0.3
9. Turnip	..	0.4	Tr.	2.0	12	22	16	..	0.5	..	Tr.	00	14.0	20	..
<b>IV. Vegetables.</b>															
1. Brinjal	..	0.5	Tr.	2.3	13.5	11.1	18	..	0.4	..	2.0	30	12.0	30	0.4
2. Cabbage	..	0.7	0.1	2.3	13	75.0	21	..	0.3	Tr.	4450.0	57	61.0	25	0.4
3. Cauliflower	..	1.2	0.1	2.2	13.0	11.2	29	..	0.4	0.2	15.0	105	30	54	0.5
4. Ipomoea leaves	..	1.1	0.2	2.1	15.0	40.0	25	..	1.0	..	1,805.0	30	60	75	0.3
5. Lady's finger	..	0.0	0.1	3.0	18.0	50.0	43	..	0.7	..	23	30	..	..	..
6. Metya Sug	..	0.8	0.25	3.0	17.0	..	..	..	..	..	..	..	..	..	..
7. Palang	..	1.7	0.4	2.8	18.0	150.0	25	..	0.0	1.2	2,073.0	00	33.0	..	..
8. Papaya green	..	0.3	0.05	5.0	21.0	5.0	5	..	0.2	..	678	12	48.0	15	0.3
9. Patal	..	0.0	0.15	0.0	0.0	27.0	154	..	0.8	..	..	12	..	..	..
10. Pumpkin	..	0.5	0.2	2.0	15.0	12.0	0	..	0.2	..	33	22	0.0	27	..
11. Tomato	..	0.8	0.07	2.0	12.0	10.0	20	..	1.2	..	128	30	10.0	23	0.2

## APPENDIX V b

## Approximate Nutritive values of certain common foods of Bengal

(On one chatak-about 2 oz.)

(2)

Name of food.	Protein g.		Fat. g.	Carbo- hydrate g.	Calo- ries.	Calcium mgm.	Phosphorus mgm.		Iron mgm.		Caro- tene & Vit. A. ug.	Vit. B <sub>1</sub> ug.	Vit. C mg.	Ribofl. ug.	Nicotin-ic acid mg.
	Anlm.	Veg.					Total.	Average.	Total.	Average.					
V. Fruits.															
1. Apple . . .	..	0.2	Tr.	7.0	23.0	0.0	0.0	..	0.5	..	..	60	5	15	..
2. Amla . . .	..	0.2	Tr.	6.3	27.0	11.0	12.0	..	..	..	..	..	..	..	..
3. Banana . . .	..	0.6	0.2	12.7	224.0	4.2	20.0	..	0.3	..	50	135	32	25	0.2
4. Coconut . . .	..	1.0	15.0	6.2	165	5	33	55	1.0	Tr.	..	..	4	..	..
5. Green coconut water	..	..	..	1.4	..	10.0	..	..	..	..	..	..	..	..	..
6. Dates . . .	..	1.2	Tr.	37.0	166.0	344.0	37.0	..	3.0	..	210	45	62	..	..
7. Guava . . .	..	0.5	0.1	4.0	19.0	255	10	..	0.6	..	..	..	8	6	0.1
8. Grapes . . .	..	0.4	0.4	0.1	30.0	10	8	..	0.8	..	0	..	1	10	0.2
9. Jack fruit	..	0.9	Tr.	0.5	43.0	10	15	..	0.3	..	210	15	3	..	..
10. Lemon . . .	..	0.4	Tr.	4.5	19.0	35	8.5	..	0.0	..	..	..	20	2	..
11. Lime . . .	..	0.6	0.3	6.0	28.0	15	10.0	..	0.2	..	34	..	20	..	..
12. Mango . . .	..	0.3	0.2	7.2	31.0	4	10.0	..	Tr.	..	2,352	..	30	25	0.2
13. Orange . . .	..	0.4	Tr.	5.5	23.0	18	8.0	..	0.5	..	105	60	16	25	..
14. Papaya ripe	..	0.3	Tr.	5.0	21.0	2.5	3.0	..	0.2	..	678	12	48	0	..
15. Pineapple . . .	..	0.2	0.1	0.1	27.0	8	4.0	..	0.5	..	17	81	18	10	..
16. Pomegranate	..	0.6	0.3	7.3	35.0	6	23.0	..	0.5	..	..	..	8	..	..
VI. Milk and Milk Products.															
1. Buffalo's milk	2.0	..	3.8	2.5	55.0	95.0	59.0	..	0.1	..	24	..	0.5	..	0.1
2. Cow's milk	1.7	..	2.0	2.4	36.0	60.0	15.0	..	Tr.	..	25	12	1.4	140	0.1
3. Goat's milk	1.7	..	2.4	1.9	40.0	83.0	0.0	..	0.1	..	25	..	4.7	..	..
4. Butter . . .	0.3	..	41.0	0.2	375.0	7.0	12.0	..	0.8	..	42	..	2.5	..	..
5. Chana . . .	1.1	..	1.0	0.15	57	Tr.	Tr.	..	0.3	..	20	27	..	..	..
6. Milk whey	..	..	Tr.	26.0	208	..	21	..	..	..	..	..	..	..	..
7. Curd . . .	1.8	..	1.8	1.6	17	60	15	..	0.4	..	20	..	..	..	..
8. Ghee . . .	..	..	50.0	..	450	..	..	..	..	..	600	..	..	..	..

APPENDIX (V) (b).  
Approximate Nutritive values of certain common foods of Bengal.  
(On one chatak-about 2 oz.)

(3)

Name of food.	Protein g.		Fat g.	Carbo- hydrate g.	Calo- ries.	Calcium mgm.	Phosphorus mg.		Iron mg.		Car- otene & Vit. A ug.	Vit. B <sub>1</sub> ug.	Vit. C mg.	Riboflav. ug.	Nicotinic acid mg.
	Anim.	Veg.					Total.	Average.	Total.	Average.					
VII. Flesh Food, Fish and Egg, etc.															
1. Beef . . .	10.0	..	10.0	2.03	98	4	100	..	2.7	0.3	8	135	9	112	3.8
2. Fowl . . .	11.0	..	4.0	..	87	0	111	..	1.4	..	..	..	..	135	3.2
3. Goat meat . . .	12.5	..	1.4	..	60	..	80	..	..	..	..	..	..	125	4.0
4. Mutton . . .	30.0	..	15.5	0.3	141	6	140	..	1.2	0.3	4	15	13	112	0.1
5. Hilsa . . .	11.0	..	9.5	..	135	90	140	..	1.00	0.3	3.0	16	..	..	..
6. Kal . . .	7.4	..	4.4	..	71	205	100	..	0.0	..	..	..	..	..	..
7. Magur . . .	7.5	..	0.5	..	35	105	145	..	0.3	0.3	1.5	12	..	..	..
8. Puntl . . .	9.0	..	1.2	..	48	55	48	..	0.4	0.3	..	..	..	..	..
9. Prawn . . .	8.5	..	0.6	0.6	44	80	225	..	2.2	..	..	5	..	..	..
10. Rohit fish . . .	8.3	..	0.7	..	41	340	75	..	0.4	0.2	13.0	64	6.3	..	..
11. Vetki . . .	0.6	..	0.0	..	33	205	203	..	0.5	0.2	50.0	15	10.0	..	..
12. Hen's egg, whole . . .	0.7	..	5.2	..	74	27	112	..	1.0	..	234.0	75	..	175	..
Do. white . . .	0.1	..	0.1	..	25	0	7	..	0.05	..	Tr.	Tr.	..	112	..
Do. yolk . . .	7.8	..	16.6	..	182	97	29	..	4.0	..	585.0	195	..	290	..
13. Duck's egg, whole . . .	7.0	..	8.3	2.00	115	50	107	..	1.8	..	..	..	..	..	..
Do. white . . .	5.5	..	0.01	..	..	..	..	..	..	..	..	..	..	..	..
Do. yolk . . .	8.4	..	18.1	..	..	..	..	..	..	..	..	..	..	..	..
VIII. Oils.															
1. Mustard oil . . .	..	..	50.0	..	450	..	..	..	..	..	..	..	..	..	..
2. Dalda . . .	..	..	50.0	..	450	..	..	..	..	..	..	..	..	..	..
3. Shark liver oil . . .	..	..	50.0	..	450	..	..	..	..	..	125,000—400,000	..	..	..	..
4. Cod liver oil . . .	..	..	50.0	..	450	..	..	..	..	..	0.250—25,000	..	..	..	..

## APPENDIX (VI) (PP. 278—290)

(A) Distribution of nutritional deficiencies according to week of survey :—

- (a) General,
- (b) Vitamin A
- (c) Vitamin B<sub>1</sub>
- (d) Vitamin B<sub>2</sub>
- (e) Vitamin C
- (f) Vitamin D
- (g) Iron

(B) Distribution of nutritional deficiencies according to age and sex :—

- (h+i) General
- (j+k) Vitamin A
- (l+m) Iron.

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## APPENDICES—TABLES

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## APPEN

## DISTRIBUTION OF NUTRITIONAL DEF

## (a) Gene

General. Week of Survey.			1	2	3	4	5	6	7	8
Normal	.	No.	..	0	83	164	137	178	182	154
		%	..	50.3	52.0	58.4	55.0	61.5	62.6	48.7
Slight .	.	No.	..	6	62	103	97	94	102	140
		%	..	37.5	30.5	38.4	39.0	34.1	35.1	44.3
Mod. & Marked	.	No.	..	1	12	10	15	4	7	22
		%	..	0.3	7.6	3.2	6.0	1.4	2.4	7.0
TOTAL			..	16	157	281	249	276	291	316

## (b) Vita

Vitamin A Week of Survey.			1	2	3	4	5	6	7	8
Normal	.	No.	..	12	100	178	161	184	103	204
		%	..	75.0	60.4	63.3	61.7	66.7	68.0	64.6
Slight	.	No.	..	4	30	90	81	88	80	107
		%	..	25.0	24.8	35.2	32.5	31.0	30.6	33.0
Moderate	.	No.	..	..	9	4	7	4	4	5
		%	..	..	5.7	1.4	2.8	1.4	1.4	1.6
Marked	.	No.	..	..	..	..	..	..	..	..
		%	..	..	..	..	..	..	..	..
TOTAL			..	16	157	281	249	276	291	316

## (c) Vita

Vitamin B <sub>1</sub> . Week of Survey.			1	2	3	4	5	6	7	8	
Normal	.	.	No.	..	16	156	277	245	260	290	316
			%	..	100.0	99.4	98.6	98.4	97.5	99.7	100.0
Slight	.	.	No.	..	..	1	4	4	6	1	..
			%	..	..	0.6	1.4	1.6	2.2	0.3	..
Moderate	.	.	No.	..	..	..	..	..	1	..	..
			%	..	..	..	..	..	0.4	..	..
Marked	.	.	No.	..	..	..	..	..	..	..	..
			%	..	..	..	..	..	..	..	..
TOTAL			..	16	157	281	249	276	291	316	

## DIX VI(A).

CORNOTES ACCORDING TO WEEK OF SURVEY.

val.

9	10	11	12	13	14	15	16	17
182	224	120	180	140	135	127	149	120
54.8	77.2	52.6	65.7	68.0	66.8	46.2	48.7	50.6
122	65	62	89	65	66	110	124	106
37.0	22.4	40.4	32.5	30.7	32.7	40.0	40.5	44.7
27	1	16	5	7	1	38	38	11
18.1	.4	7.0	1.6	3.3	.5	13.8	10.8	4.6
332	290	228	274	212	202	275	306	237

min A.

9	10	11	12	13	14	15	16	17
242	209	146	189	129	150	175	233	154
72.0	72.1	64.0	69.0	60.8	77.2	63.6	70.1	65.0
37	75	75	80	73	44	67	69	77
26.2	25.0	32.0	29.2	34.4	21.8	35.3	22.5	32.5
3	6	5	5	10	2	3	4	6
0.9	2.1	2.2	1.6	4.7	1.0	1.1	1.3	2.5
..	..	2	..	..	..	..	..	..
..	..	0.9	..	..	..	..	..	..
332	290	228	274	212	202	275	306	237

min B<sub>1</sub>.

9	10	11	12	13	14	15	16	17
329	288	221	267	200	199	273	304	235
99.1	99.3	96.0	97.4	93.6	98.5	99.3	99.2	99.2
3	2	7	7	3	3	2	1	2
0.9	0.7	3.1	2.6	1.4	1.5	0.7	0.3	0.8
..	..	..	..	..	..	..	1	..
..	..	..	..	..	..	..	0.3	..
..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..
332	290	228	274	212	202	275	306	237

## DISTRIBUTION OF NUTRITIONAL DEFICIENCY

(a) General

General. Week of Survey.		18	19	20	21	22	23	24	25
Normal . . .	No.	148	84	113	122	74	106	119	84
	%	50.1	40.0	54.0	61.3	53.0	58.0	46.7	86.6
Slight . . .	No.	90	103	85	67	52	105	118	11
	%	36.4	40.0	41.3	33.7	37.7	36.7	46.3	11.3
Mod. & Marked . . .	No.	20	23	8	10	12	15	18	2
	%	7.0	11.0	3.9	5.0	8.7	5.2	7.1	2.1
TOTAL		264	210	206	199	138	286	253	97

(b) Vitamin A

Vitamin A. Week of Survey.		18	19	20	21	22	23	24	25
Normal . . .	No.	185	130	172	156	118	194	203	67
	%	70.1	61.0	83.6	78.4	85.5	67.8	81.6	89.7
Slight . . .	No.	74	78	33	43	18	87	46	10
	%	28.0	37.1	16.0	21.6	13.0	30.4	18.0	10.3
Moderate . . .	No.	5	2	1	..	2	5	1	..
	%	1.9	1.0	0.5	..	1.4	1.7	0.4	..
Marked . . .	No.	..	..	..	..	..	..	..	..
	%	..	..	..	..	..	..	..	..
TOTAL		264	210	206	199	138	286	253	97

(c) Vitamin B<sub>1</sub>

Vitamin B <sub>1</sub> . Week of Survey.		18	19	20	21	22	23	24	25
Normal . . .	No.	263	208	204	199	138	288	255	94
	%	99.6	99.0	99.0	100.0	100.0	99.0	100.0	90.8
Slight . . .	No.	1	2	2	..	..	3	..	3
	%	0.4	1.0	1.0	..	..	1.0	..	3.1
Moderate . . .	No.	..	..	..	..	..	..	..	..
	%	..	..	..	..	..	..	..	..
Marked . . .	No.	..	..	..	..	..	..	..	..
	%	..	..	..	..	..	..	..	..
TOTAL		264	210	206	199	138	286	255	97

## DIX VI (A).

CIENCIES ACCORDING TO WEEK OF SURVEY.

ral.

26	27	28	29	30	31	32	33	Total.
33	59	60	00	43	40	47	38	
40.7	57.8	01.0	58.0	63.2	55.4	40.1	55.1	
31	30	31	39	25	31	52	29	
38.3	35.5	32.0	34.8	30.8	37.3	51.0	42.0	
17	7	0	7	..	6	3	2	
21.0	0.9	0.2	0.3	..	7.2	2.9	2.0	
81	102	97	112	68	83	102	60	6311

min A.

20	27	28	29	30	31	32	33	Total.
00	00	76	90	59	73	77	53	
85.2	88.2	78.4	85.7	90.8	88.0	75.5	76.8	
11	11	15	16	9	10	25	15	
13.6	10.8	15.6	14.3	13.2	12.0	24.5	21.7	
1	1	0	..	..	..	..	1	
1.2	1.0	0.2	..	..	..	..	1.4	
..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	
81	102	97	112	68	83	102	60	6311

min B<sub>1</sub>.

20	27	28	29	30	31	32	33	Total.
81	102	00	112	67	81	100	67	
100.0	100.0	90.0	100.0	98.5	97.0	98.0	97.1	
..	..	1	..	1	2	2	2	
..	..	1.0	..	1.5	2.4	2.0	2.0	
..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	
81	102	97	112	68	83	102	60	6311

## APPEN

## DISTRIBUTION OF NUTRITIONAL DEFICIENCY

(d) Vitamin B<sub>12</sub>

Vitamin B <sub>12</sub> Week of Survey.			1	2	3	4	5	6	7	8	
Normal	.	.	No.	..	10	132	251	208	228	270	209
			%	..	02.5	84.1	80.3	83.6	82.6	02.8	94.6
Slight	.	.	No.	..	6	24	30	41	47	20	17
			%	..	37.5	15.2	10.7	16.5	17.0	6.9	5.4
Moderate	.	.	No.	..	..	1	..	..	..	1	..
			%	..	..	0.7	..	..	0.4	0.3	..
Marked	.	.	No.	..	..	..	..	..	..	..	..
			%	..	..	..	..	..	..	..	..
TOTAL			..	16	157	281	249	276	201	316	

(e) Vitamin C

Vitamin C. Week of Survey.			1	2	3	4	5	6	7	8	
Normal	.	.	No.	..	10	123	244	210	232	261	292
			%	..	62.5	78.	86.8	88.0	84.1	80.7	92.4
Slight	.	.	No.	..	6	3	36	30	44	20	24
			%	..	37.5	10.7	12.8	12.0	15.0	10.0	7.6
Moderate	.	.	No.	..	..	3	1	..	..	1	..
			%	..	..	1.9	0.4	..	..	0.3	..
Marked	.	.	No.	..	..	..	..	..	..	..	..
			%	..	..	..	..	..	..	..	..
TOTAL			..	7	157	281	240	276	201	316	

(f) Vitamin D

Vitamin D. Week of Survey.			1	2	3	4	5	6	7	8
Normal	{	No.	..	15	158	264	246	273	285	315
		%	..	03.8	97.5	94.0	98.8	98.9	97.0	99.7
Slight	{	No.	..	1	2	17	3	3	6	1
		%	..	6.3	1.2	6.0	1.2	1.1	2.1	0.3
Moderate	{	No.	..	..	2	..	..	..	..	..
		%	..	..	1.3	..	..	..	..	..
Marked	{	No.	..	..	..	..	..	..	..	..
		%	..	..	..	..	..	..	..	..
TOTAL			..	16	157	281	249	276	291	316

## DIX VI (A).

CIENCIES ACCORDING TO WEEK OF SURVEY.

*min B<sub>2</sub>.*

9	10	11	12	13	14	15	16	17
288	289	200	242	206	196	261	299	231
86.7	90.7	87.7	88.3	97.2	97.0	94.9	97.7	97.5
44	1	24	31	6	6	14	7	6
13.3	0.3	10.5	11.3	2.3	3.0	5.1	2.3	2.5
..	..	3	1	..	..	..	..	..
..	..	1.3	0.4	..	..	..	..	..
..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..
332	290	228	274	212	202	275	306	237

*min C.*

9	10	11	12	13	14	15	16	17
304	268	216	215	176	196	222	280	206
91.6	90.7	94.7	78.5	83.0	97.0	80.7	91.5	86.9
20	27	12	57	34	6	47	24	28
7.8	9.3	5.3	20.8	16.0	3.0	17.1	7.8	11.8
2	..	..	2	2	..	6	2	3
0.6	..	..	0.7	0.9	..	2.2	0.7	1.3
..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..
332	290	228	274	212	202	275	306	237

*min D.*

9	10	11	12	13	14	15	16	17
332	287	227	272	211	201	273	306	237
100.0	99.0	99.6	99.3	99.5	99.5	99.3	100.0	100.0
..	3	..	2	1	1	2	..	..
..	1.0	..	0.7	10.5	0.5	0.7	..	..
..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..
332	290	228	274	212	202	275	306	237

## DISTRIBUTION OF NUTRITIONAL DEFICIENCY

(d) *Vita*

Vitamin B <sub>2</sub> . Week of Survey.			18	19	20	21	22	23	24	25	
Normal	.	{	No.	247	201	195	199	116	286	243	88
			%	93.6	95.7	94.7	100.0	84.1	100.0	95.3	90.7
Slight	.	{	No.	17	9	11	..	18	..	12	0
			%	6.4	4.3	5.3	..	13.0	..	4.7	9.3
Moderate	.	{	No.	..	..	..	..	4	.	..	..
			%	..	..	..	..	2.0	.	..	..
Marked	.	{	No.	..	..	..	..	..	..	..	.
			%	..	..	..	..	..	..	..	..
TOTAL			264	210	206	199	138	286	255	97	

(e) *Vita*

Vitamin C. Week of Survey.				18	19	20	21	22	23	24	25	
Normal	.	.	{	No.	259	177	206	198	136	263	225	96
				%	98.1	84.3	100.0	99.5	98.6	92.0	88.2	90.0
Slight	.	.	{	No.	5	33	..	1	2	23	30	1
				%	1.9	15.7	..	0.5	1.4	8.0	11.8	1.0
Moderate	.	.	{	No.	..	..	..	..	..	..	..	..
				%	..	..	..	..	..	..	..	..
Marked	.	.	{	No.	..	..	..	..	..	..	..	..
				%	..	..	..	..	..	..	..	..
TOTAL				264	210	206	199	138	266	255	97	

(f) *Vita*

Vitamin D. Week of Survey.			18	19	20	21	22	23	24	25	
Normal	.	{	No.	262	210	205	196	135	285	253	96
			%	99.2	100.0	99.5	98.5	97.8	99.7	99.2	99.0
Slight	.	{	No.	2	..	1	2	3	1	1	1
			%	0.8	..	0.5	1.0	2.2	0.3	0.4	1.0
Moderate	.	{	No.	..	..	..	..	..	1	..	
			%	..	..	..	..	..	..	0.4	..
Marked	.	{	No.	..	..	..	1	..	..	..	..
			%	..	..	..	0.5	..	..	..	..
TOTAL			264	210	206	199	138	286	255	97	

## DIX VI (A).

CIENCIES ACCORDING TO WEEK OF SURVEY.

*min B.*

20	27	28	29	30	31	32	33	Total.
70	102	05	112	08	83	102	68	
97.5	100.0	07.0	100.0	100.0	100.0	100.0	98.0	
2	..	1	..	..	..	..	1	
2.5	..	1.0	..	..	..	..	1.4	
..	..	1	..	..	..	..	..	
..	..	1.0	..	..	..	..	..	
..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	
81	102	07	112	08	83	102	69	6311

*min C.*

20	27	28	29	30	31	32	33	Total.
61	07	00	111	08	81	05	01	
100.0	05.1	00.0	00.1	100.0	07.0	03.1	88.1	
..	5	1	1	..	2	7	8	
..	4.0	1.0	0.0	..	2.4	0.0	11.5	
..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	
81	102	07	112	08	83	102	09	0311

*min D.*

20	27	28	29	30	31	32	33	Total.
81	102	06	112	08	82	102	00	
100.0	100.0	09.0	100.0	100.0	08.8	100.0	100.0	
..	..	1	..	..	1	..	..	
..	..	1.0	..	..	1.2	..	..	
..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	
81	102	07	112	08	83	102	60	0311



## APPEN

## DISTRIBUTION OF NUTRITIONAL DEFICI-

(g) Ir

Fr. Week of Survey.		1	2	3	4	5	6	7	8
Normal . . .	No.	..	16	125	210	182	214	223	181
	%	..	100.0	70.6	77.0	73.1	77.5	76.6	57.3
Slight . . .	No.	..	..	31	60	64	62	68	133
	%	..	..	10.7	21.4	25.7	22.5	23.4	42.1
Mod. & Marked . .	No.	..	..	1	2	3	..	..	2
	%	..	..	.6	.7	1.2	..	..	.6
TOTAL .		..	16	157	281	240	276	291	310

## APPEN

## DISTRIBUTION OF NUTRITIONAL DEFICI-

(g) Ir

Fr. Week of Survey.		18	19	20	21	22	23	24	25
Normal . . .	No.	111	132	100	104 ✓	64	182	95	84
	%	42.0	62.9	52.0	52.3	46.4	63.6	37.3	86.6
Slight . . .	No.	153	78	07	94	74	103	160	13
	%	58.0	37.1	47.1	47.2	53.6	36.0	62.7	13.4
Mod. & Marked . .	No.	..	..	..	1	..	1	..	..
	%	..	..	..	.5	..	.4	..	..
TOTAL .		264	210	206	199	138	286	255	97

## DIX VI (A).

CIENCIES ACCORDING TO WEEK OF SURVEY.

on.

9	10	11	12	13	14	15	16	17
174	260	142	160	112	151	120	142	157
52.4	02.8	02.3	03.4	52.8	74.8	43.6	46.1	60.2
156	21	84	112	96	51	155	162	80
47.0	7.2	36.8	40.0	45.3	25.2	56.4	52.0	32.8
2	..	2	2	1	..	..	2	..
.0	..	.0	.7	.0	..	..	.7	..
332	290	228	274	212	202	275	306	237

## DIX VI (A).

CIENCIES ACCORDING TO WEEK OF SURVEY.

on.

26	27	28	29	30	31	32	33	Total.
45	33	68	57	47	51	61	30	
55.6	32.4	70.1	30.0	00.1	01.4	50.8	43.5	
36	68	28	55	21	32	41	30	
44.4	06.7	28.0	40.1	30.0	38.6	40.2	50.5	
..	1	1	..	..	..	..	..	
..	.0	1.0	..	..	..	..	..	
81	102	97	112	68	83	102	60	6,311

# APPENDIX VI (B).

238

(h) General Nutritional Deficiency of the Male Population According to Age.

	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	55+	Total.
No. Expt. No.	208	207	241	220	182	140	165	173	113	69	72	127	1,926
Normal	280-0	288-0	264-0	172-0	149-5	134-1	141-2	115-1	105-0	64-1	75-3	135-8	1,171
Slight	137	231	170	64	62	71	70	66	63	34	51	93	82-6
No. Expt. No.	190-2	175-6	100-5	105-0	80-0	81-5	85-8	70-0	64-2	39-0	45-8	0	150
oderate & marked	17	49	34	7	8	6	4	5	2	5	4	0	10-6
No. Expt. No.	21-8	22-5	20-6	13-4	11-6	10-4	11-0	6-0	8-2	5-0	5-0	10-6	3,217
TOTAL	472	487	446	291	252	226	238	104	178	108	127	229	3,217

(i) General Nutritional Deficiency of Female Population According to Age.

	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	55+	Total.
No. Expt. No.	257	240	100	180	154	148	129	73	81	42	30	80	1,661
Normal	262-4	257-5	101-0	142-0	104-8	139-8	124-7	79-2	87-8	40-3	50-4	130-6	1,188
Slight	105	108	94	61	90	80	83	60	64	42	57	140	215
No. Expt. No.	187-7	184-2	115-5	101-0	117-0	90-3	80-2	50-6	62-8	35-3	40-3	07-7	215
Moderate & marked	32	37	14	12	21	22	18	4	17	7	8	23	17-7
No. Expt. No.	34-0	33-3	20-9	18-4	21-3	15-0	10-1	10-2	11-4	0-4	7-3	17-7	3,064
TOTAL	484	475	208	262	304	256	230	146	162	61	104	262	3,064

APPENDIX VI (B)—contd.  
(j) Frequency Distribution of Vitamin A Deficiency According to Age in Respect of Males.

	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	55+	Total.
Normal	910	280	206	220	217	103	189	154	130	79	01	120	2,267
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
Slight	154	191	141	54	32	33	48	30	40	26	69	05	910
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
Moderate	32-6	39-2	31-7	18-6	12-7	14-6	20-2	20-1	25-8	24-1	47-2	41-5	61
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
Marked	8	7	8	8	3	0	1	1	2	3	6	14	01
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
	1-7	1-4	1-8	2-8	1-2	0-0	0-4	0-5	1-1	2-8	4-7	0-1	0
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
	0	0	0	0	0	0	0	0	0	0	0	0	0
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
TOTAL	472	487	445	201	252	226	238	194	178	108	127	229	3,247

(k) Frequency Distribution of Vitamin A Deficiency According to Age in Respect of Females.

	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	55+	Total .
Normal	329	310	298	227	263	228	182	123	118	56	75	107	2,255
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
Slight	68-0	67-2	76-5	86-6	86-5	80-1	70-1	84-3	72-8	61-6	72-1	42-5	670
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
Moderate	143	154	68	35	41	27	46	22	44	33	27	126	41
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
Marked	20-6	32-4	22-8	13-4	13-5	10-6	20-0	15-1	27-2	36-3	26-0	50-0	2
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
	12	2	2	0	0	1	2	1	0	2	2	17	6-8
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
	2-5	0-4	0-7	0-0	0-0	0-4	0-9	0-7	0-0	2-2	1-9	0-8	2
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
	0	0	0	0	0	0	0	0	0	0	0	0-8	0
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0
	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	{ No. }	
	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	{ % }	
TOTAL	484	476	208	262	304	256	230	146	162	91	104	252	3,064

APPENDIX VI (B)—*contd.*  
 (b) *Frequency Distribution of Iron Deficiency According to Age in Respect of Males.*

	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	55+	Total.
Normal	No. 312	No. 296	No. 290	No. 191	No. 159	No. 150	No. 145	No. 124	No. 115	No. 69	No. 76	No. 127	1,054
	% 69.1	% 66.8	% 65.2	% 65.6	% 63.1	% 66.4	% 60.0	% 63.0	% 64.6	% 63.9	% 50.8	% 53.5	1,183
Slight	No. 157	No. 190	No. 153	No. 100	No. 91	No. 76	No. 93	No. 70	No. 83	No. 39	No. 51	No. 100	1,183
	% 33.3	% 39.0	% 34.4	% 34.4	% 36.1	% 33.6	% 39.1	% 36.4	% 35.4	% 36.1	% 40.2	% 43.7	10
Moderate	No. 2	No. 1	No. 2	No. 0	No. 2	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	0
	% 0.6	% 0.2	% 0.4	% 0.0	% 0.8	% 0.0	% 0.0	% 0.0	% 0.0	% 0.0	% 0.0	% 0.0	0
Marked	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	0
TOTAL	472	437	445	291	252	220	238	194	178	108	127	220	3247

(m) *Frequency Distribution of Iron Deficiency According to Age in Respect of Females.*

	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50	-55	55+	Total.
Normal	No. 317	No. 303	No. 189	No. 164	No. 180	No. 112	No. 130	No. 71	No. 83	No. 50	No. 60	No. 127	1,806
	% 65.5	% 63.8	% 63.4	% 68.8	% 59.2	% 55.5	% 56.5	% 48.0	% 51.2	% 54.0	% 57.7	% 50.4	1,944
Slight	No. 163	No. 172	No. 107	No. 107	No. 122	No. 111	No. 90	No. 75	No. 79	No. 40	No. 44	No. 122	1,944
	% 33.7	% 36.2	% 35.0	% 40.8	% 40.1	% 44.5	% 43.0	% 51.1	% 48.8	% 41.0	% 42.3	% 48.4	4
Moderate	No. 1	No. 0	No. 2	No. 1	No. 2	No. 0	No. 1	No. 0	No. 0	No. 1	No. 0	No. 3	4
	% 0.8	% 0.0	% 0.7	% 0.4	% 0.7	% 0.0	% 0.4	% 0.0	% 0.0	% 1.1	% 0.0	% 1.2	0
Marked	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	No. 0	0
TOTAL	481	475	298	262	304	250	230	146	162	91	104	152	3,034

## APPENDIX VII. (pp. 201—202.)

(a) Sickness by cause at the time of investigation.

(b) Sickness by cause during the year.

## APPENDIX VII(A).

*Incidence of Sickness by Causes on the Sample Population during the past year (1913).*

Name of the Diseases.	No. of Cases.	Per cent of Total.
Ankylostomiasis . . . . .	1	0.04
Cataract . . . . .	4	0.15
Chicken Pox . . . . .	16	0.6
Cholera (N) . . . . .	22	0.8
Diarrhoea and Dysentery . . . . .	240	8.8
Ear diseases . . . . .	5	0.18
Eye, other diseases of . . . . .	1	0.04
Fevers, other . . . . .	85	3.1
Influenza . . . . .	38	1.4
Leprosy . . . . .	6	0.22
Malaria . . . . .	1,659	61.1
Measles (N) . . . . .	269	9.9
Miscellaneous . . . . .	170	6.3
Mumps (N) . . . . .	4	0.15
Pneumonias (Influenzal) . . . . .	38	1.4
Puerperal fevers . . . . .	7	0.26
Rheumatic fever . . . . .	12	0.4
Scabies . . . . .	8	0.29
Skin, other diseases of . . . . .	16	0.6
Tuberculosis of respiratory system (N) . . . . .	7	0.26
Typhoid and paratyphoid fevers (N) . . . . .	41	1.5
Veneral diseases . . . . .	7	0.26
Beri-beri . . . . .	1	0.04
Diabetes . . . . .	3	0.11
Diphtheria (N) . . . . .	1	0.04
Heart disease . . . . .	5	0.18
Kala-Azar . . . . .	3	0.11
Liver diseases . . . . .	5	0.18
Meningitis (N) . . . . .	1	0.04
Nephritis and other diseases . . . . .	6	0.22
Nervous diseases . . . . .	4	0.15
Rickets . . . . .	1	0.04
Senility . . . . .	1	0.04
Small-pox . . . . .	8	0.29
Snake-bite and bites of other wild animals . . . . .	2	0.07
Asthma . . . . .	19	0.7

## APPENDIX VII (B).

*Incidence of Acute and Chronic Diseases at the time of Investigation.*

Name of the Diseases.	No. of Cases.	Per cent of Total.
Chicken pox . . . . .	1	0.5
Diabetes . . . . .	2	1.0
Diarrhoeas and Dysentery . . . . .	27	13.4
Other fevers . . . . .	5	2.5
Influenza . . . . .	4	2.0
Heart disease . . . . .	2	1.0
Kala-Azar . . . . .	1	0.5
Leprosy . . . . .	4	2.0
Malaria . . . . .	75	37.1
Mensles . . . . .	7	3.5
Miscellaneous . . . . .	27	13.4
Mumps . . . . .	3	1.5
Nephritis and other diseases of urinary system . . . . .	4	2.0
Pneumonias (Influenzal) . . . . .	3	1.5
Puerperal fevers . . . . .	3	1.5
Rheumatic fever . . . . .	2	1.0
Scabies . . . . .	3	1.5
Small-pox . . . . .	1	0.5
Other diseases of skin . . . . .	2	1.0
T. B. of respiratory system . . . . .	7	3.5
Typhoid . . . . .	2	1.0
Venereal disease . . . . .	2	1.0
Asthma . . . . .	6	3.0
S. O. M. . . . .	1	0.5
N. K. . . . .	8	4.0

## APPENDIX VIII. (pp. 294—311.)

*Pictorials—*

- (a) Types of villages with dobas, tanks and groves—1—4.
- (b) Approach and gates of village houses—57.
- (c) Inside the house 8—9.
- (d) Sanitation—(1) Rubbish heap—10.  
(2) Water supply—village tube-well—11.
- (e) Village roads—12—13.
- (f) Agriculture—(1) Vegetable growing, banana and sugarcane groves—19.  
(2) Field irrigation by means of *donga*—20.
- (g) Irrigation channels and dead rivers—21—24.
- (h) Village industries—(1) Handloom—25.  
(2) Channa making—26.
- (i) Trading—(1) Vegetable production ready for transportation—27.  
(2) Transportation of channa—28.
- (j) Village primary school—29.
- (k) Singur Health Centre—30.
- (l) Singur Public Health Laboratory—31.
- (m) Singur Rajendra Mallik Memorial Hospital—32.
- (n) Golap Mohini Girls School—33.

## APPENDIX IX. (pp. 313—323.)

*Charts—*

- (i) Maximum and minimum temperature recorded at Singur, 1941-43.
- (ii) Relative humidity, 1942-43, recorded at Singur.
- (iii) Rainfall reading at Singur, 1941-43.
- (iv) Average weight according to age and sex for different population.
- (v) Average height for males and females according to age.
- (vi) Average number of terminated pregnancies including abortions for various population groupings.
- (vii) Seasonal incidence of certain diseases at Singur.
- (viii) Carriers of blood parasite according to age and sex.
- (ix) Spleen rate according to age and sex.
- (x) Percentage of haemoglobin deficiency according to age and sex.
- (xi) Percentage of hookworm carriers according to age and sex.

## APPENDIX X.

*Maps—*

1. Sketch Map of the Area for operation of the Singur Reorganization Scheme.
2. River system—Parts of Burdwan, Hooghly and Howrah Districts.







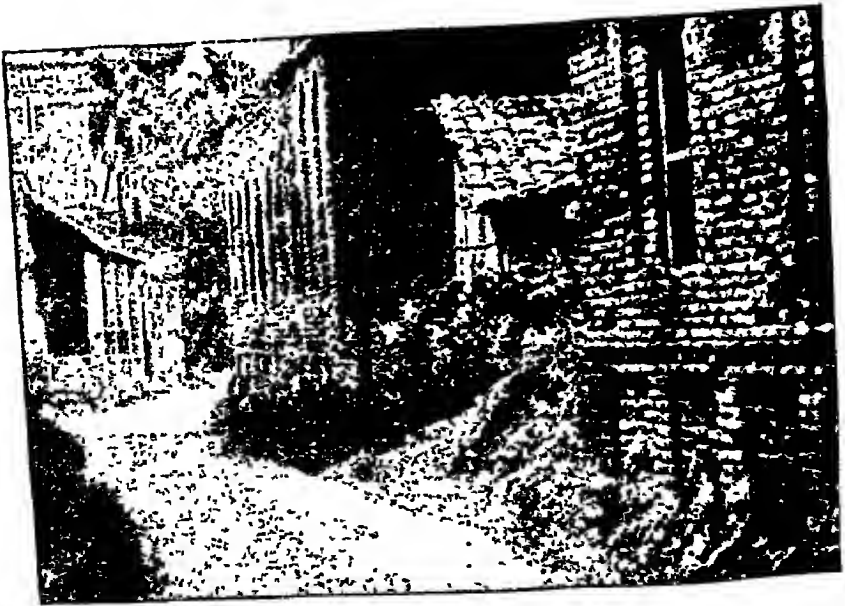
1, General View of a Bengal Village from a distance,



2. A Typical Village (South Mumudpur) with houses separated by *doba* (foreground), bamboo groves, etc.



3. A Village (Shyampur) with grouping of houses seen behind a jute grown field.



4. A part of a village (Begumpur) with semi-town setting—crowded pucca house on both sides of the road.



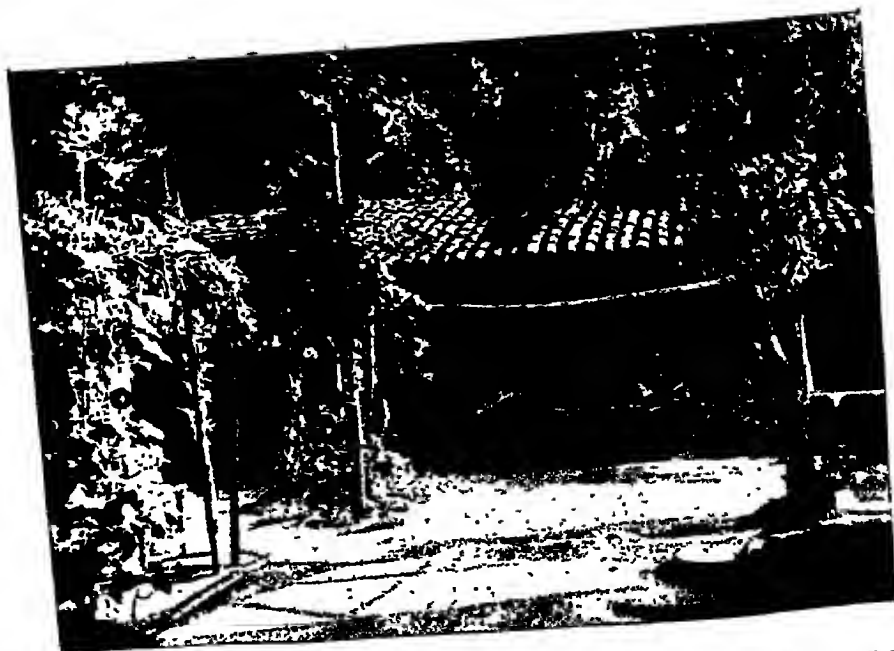
5. A typical village-house entrance from a distance. Note the cow-shed on one side.



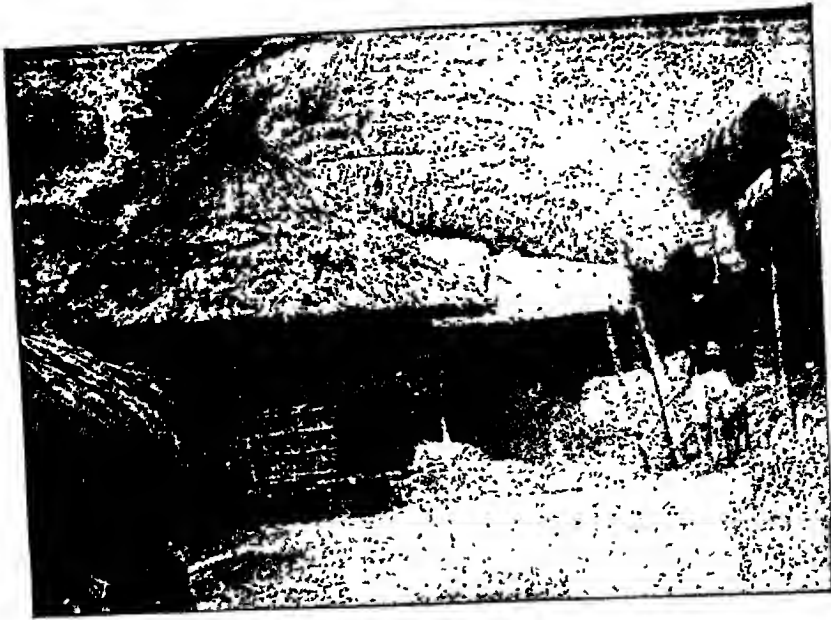
6. A house entrance with cemented plinths on either side for sitting purposes.



7. Another house entrance with obvious signs of poverty.



8. Inside a village house with clean yard. Note the cropper of marrow on a bamboo stage and the "moral" (Marked o) peeping through it on the left.



0. Inside a village house—the close view of a “morai” (marked x) the country grain store.



1 . Refuse heap stacked by the side of a mud-walled house.



11. The village boys beside a tube well. Note the banana grove in the foreground of a house.



12. A part of the metalled Baidyabati-Tarakeswar Road passing through Singur (now in bad state of repairs).



13. A *Katchha* village road,



14. A serpentine meadow path.





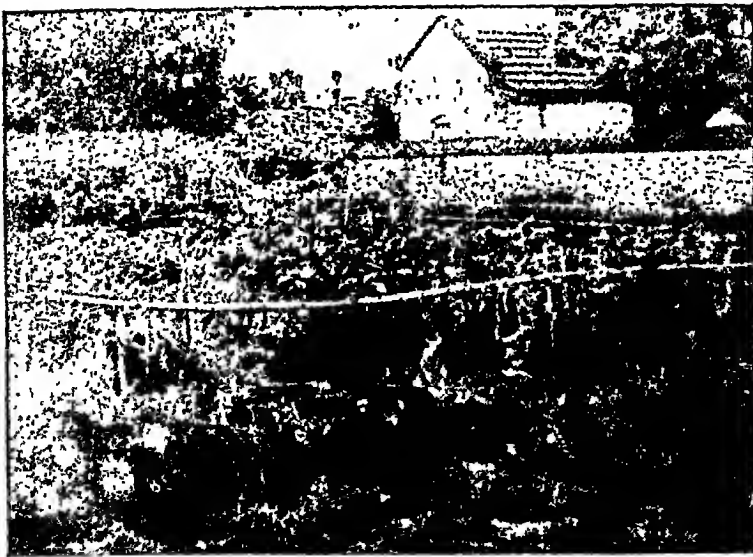
15. An inter-village road.



16. A narrow path between two *dobas* inside a village.



17. A usual breech in the *latchha* road. Note the difficulties of the passing cyclist.



18. A neighbouring agricultural fields where vegetables are grown in season. Note the banana and Sugar-cane groves at a distance.



19. Two *dongas* (long and narrow steel boat) in action lifting water from a *doba* for irrigating the neighbouring vegetable fields.



20. The lock-gate of the Gopalnagar cut ( Vide Map II) which is sometimes used as an irrigation channel.



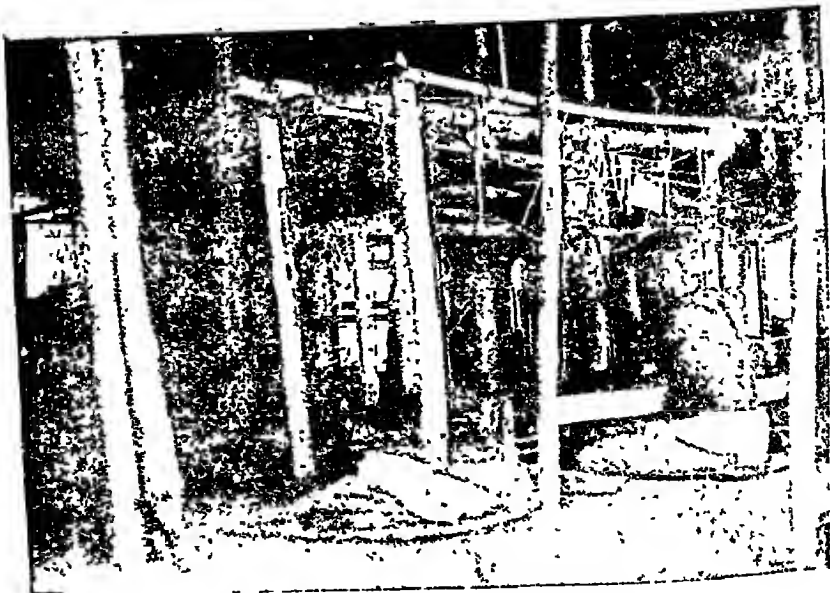
21. A view of the Gopalnagar irrigation channel:



22. A view of the dead river Kannanndi covered by water hyacinth. The lock-gate (picture No. 20) is nearby across her bed.



23. A transverse bund (marked Z) across the river-bed. Note the water collections on its either side.



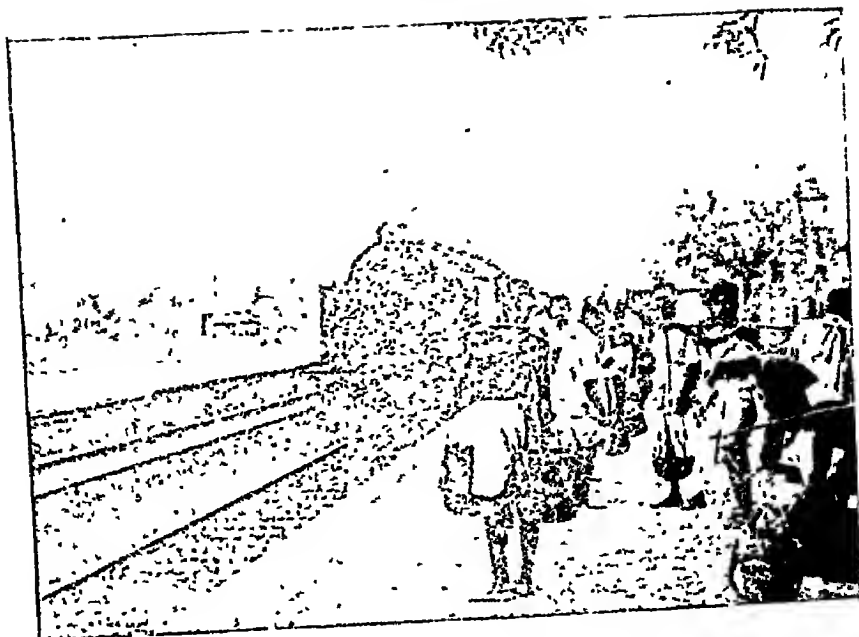
24. An artisan at work on his handloom.



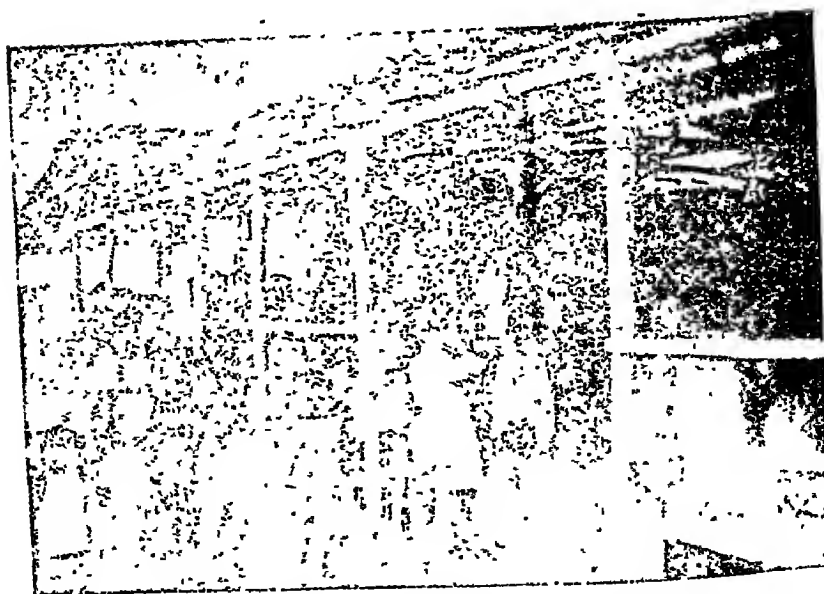
25. The indigenous process of preparing *channa* (milk casein) for transportation to Calcutta.



26. Vegetables and banana baskets on the Singur railway station platform ready for transportation.



27. Transport of *channa*. Vendors carrying baskets of *channa* are on the move at the approach of the train.



28. A typical Village Primary School (Pathsala at South Mamudpur).

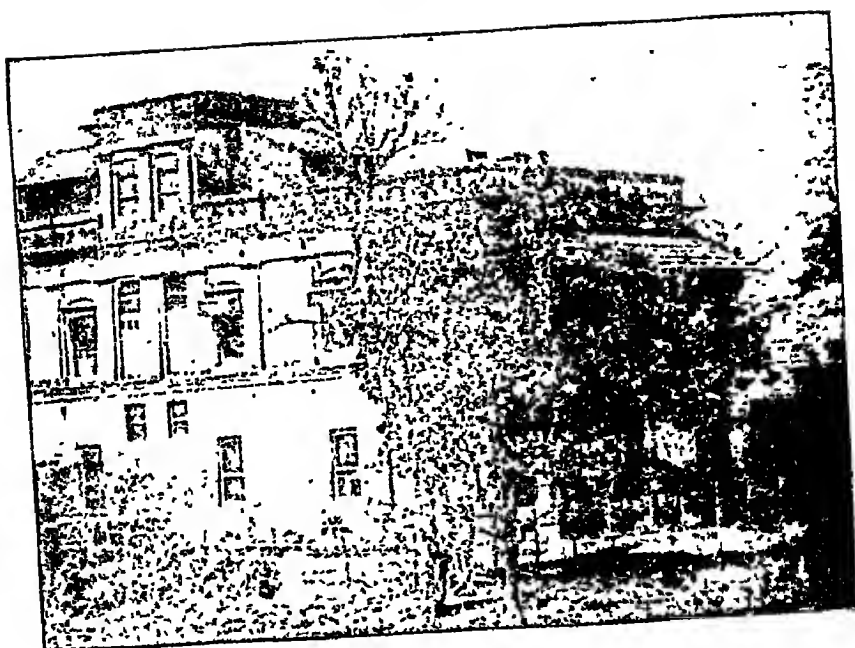


29. A survey party member carrying out health examination.



30. A view of the main building Singur Health Centre.





31. A view of the Public Health Laboratory, Singur.



32. The Rajendra Memorial Hospital, Singur.

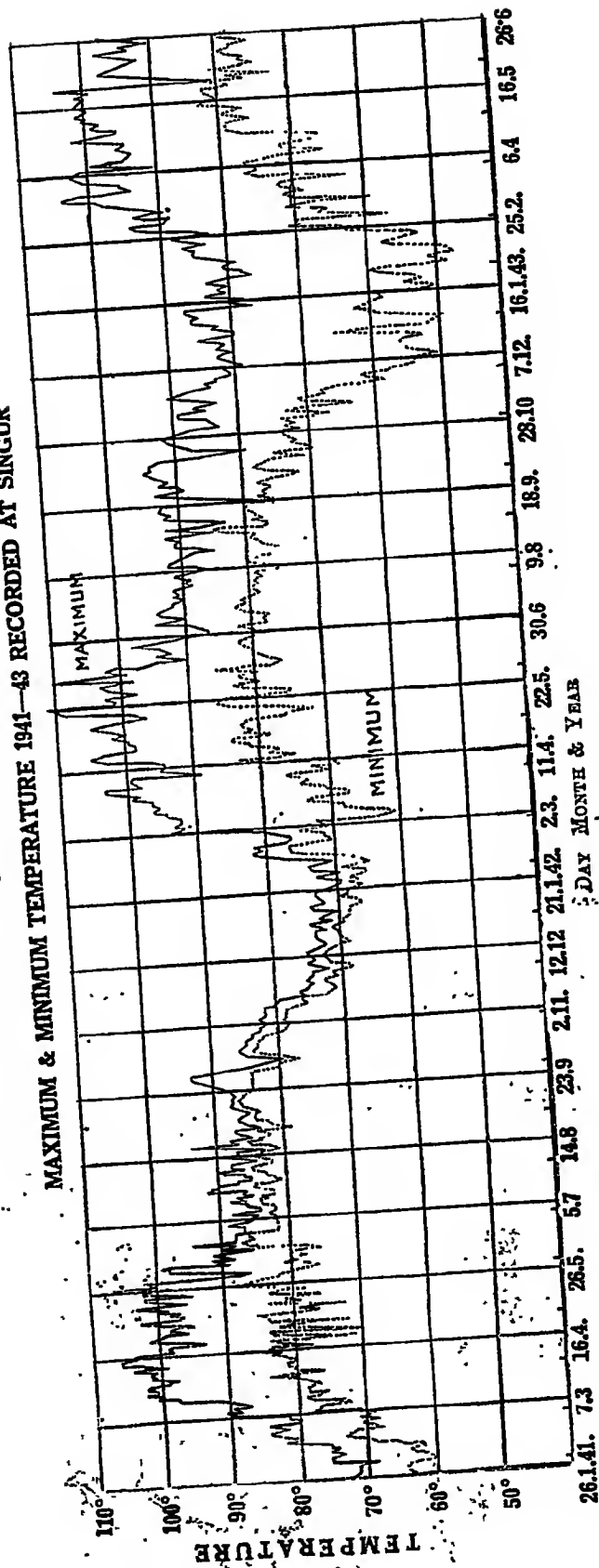


33. The Golap Mohini Girls' School, Singur.



CHART I.

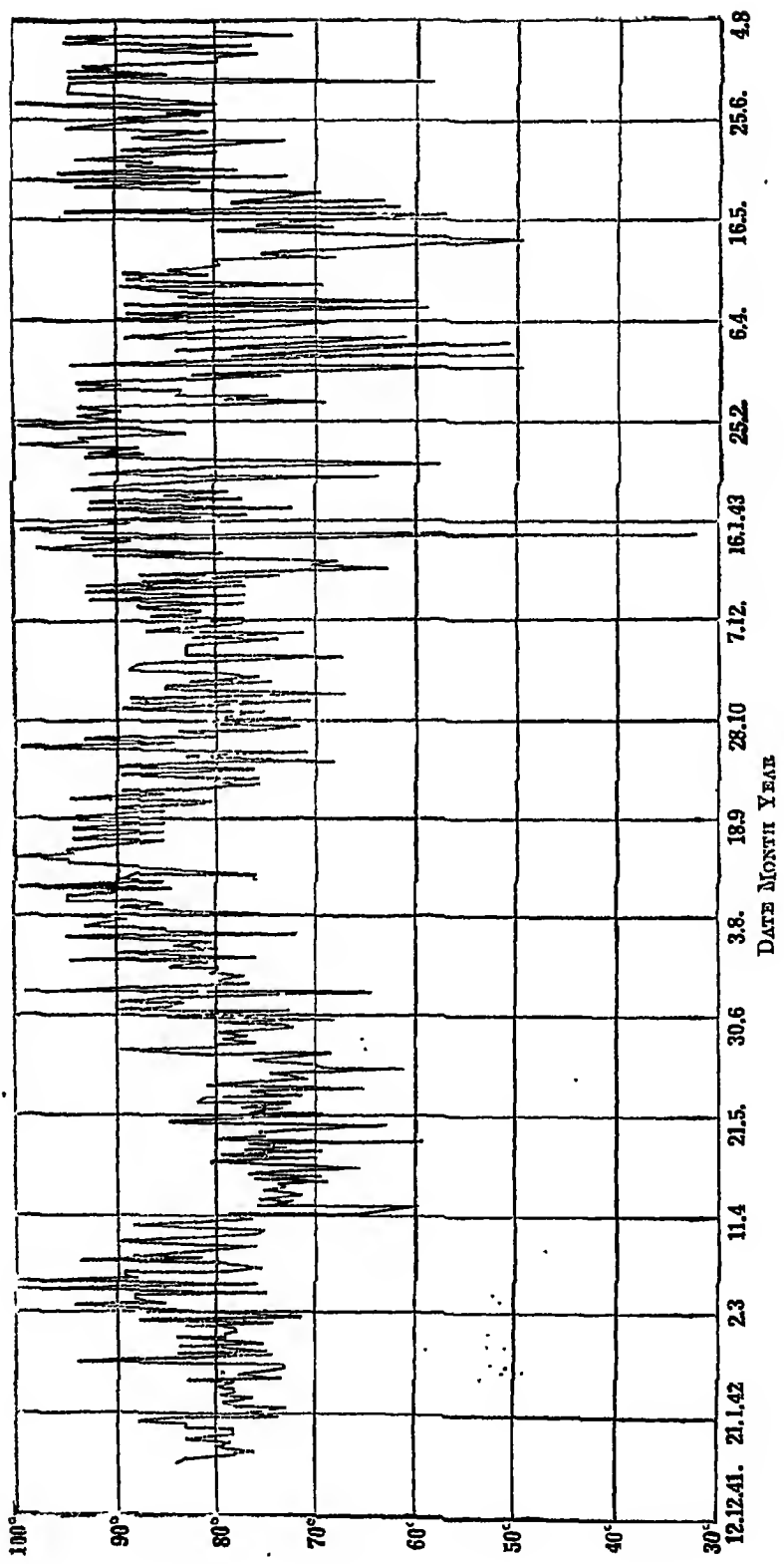
MAXIMUM & MINIMUM TEMPERATURE 1941-43 RECORDED AT SINGUR





# CHART II.

RELATIVE HUMIDITY 1942-43 RECORDED AT SINGUR





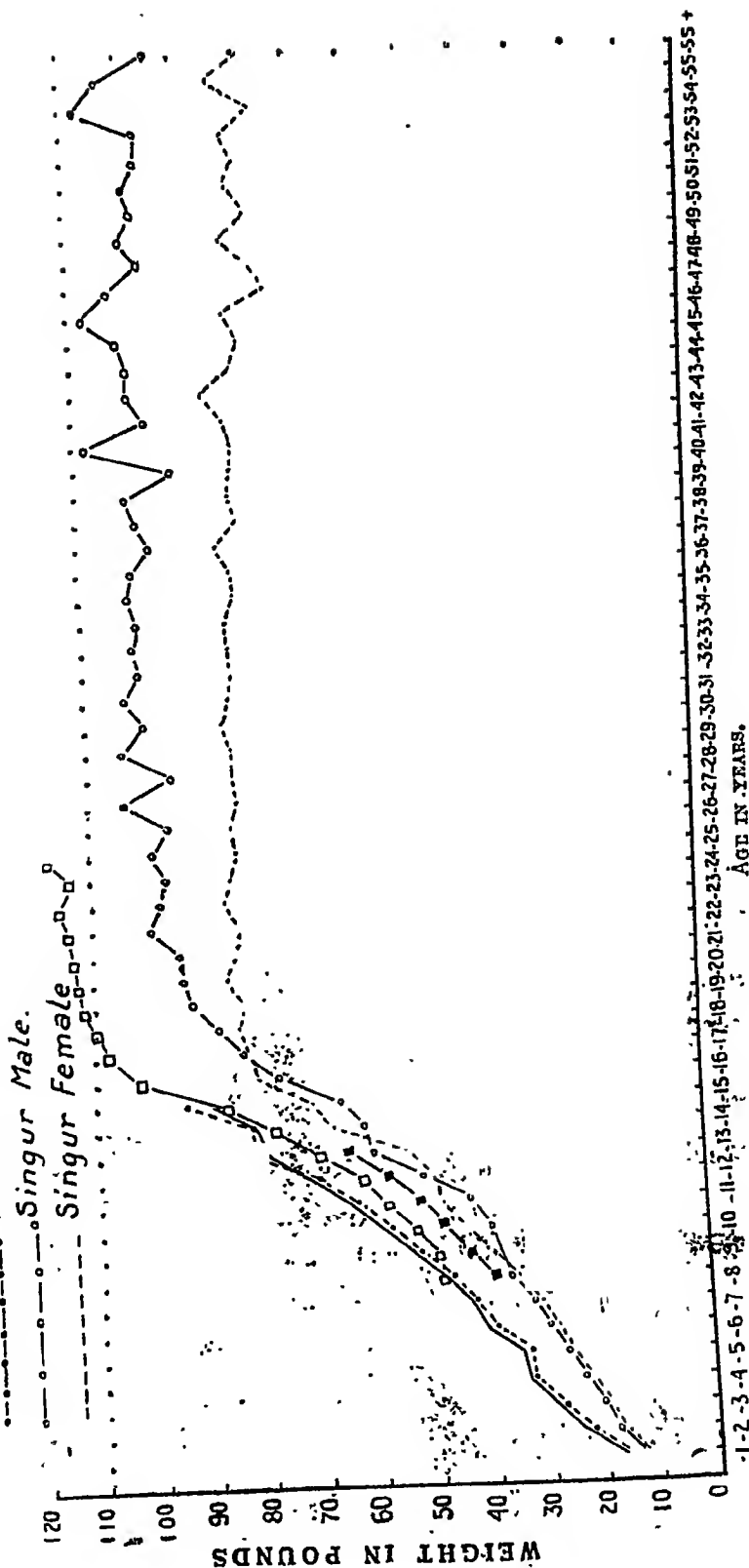
## CHART IV.

AVERAGE WEIGHT ACCORDING TO AGE AND SEX FOR DIFFERENT POPULATIONS.  
REFERENCE

— American Male.  
- - - American Female.  
— Singur Male.  
- - - Singur Female.

□ Bengali Students. (Boys)

■ Poor class Hindu. (Bengal female)

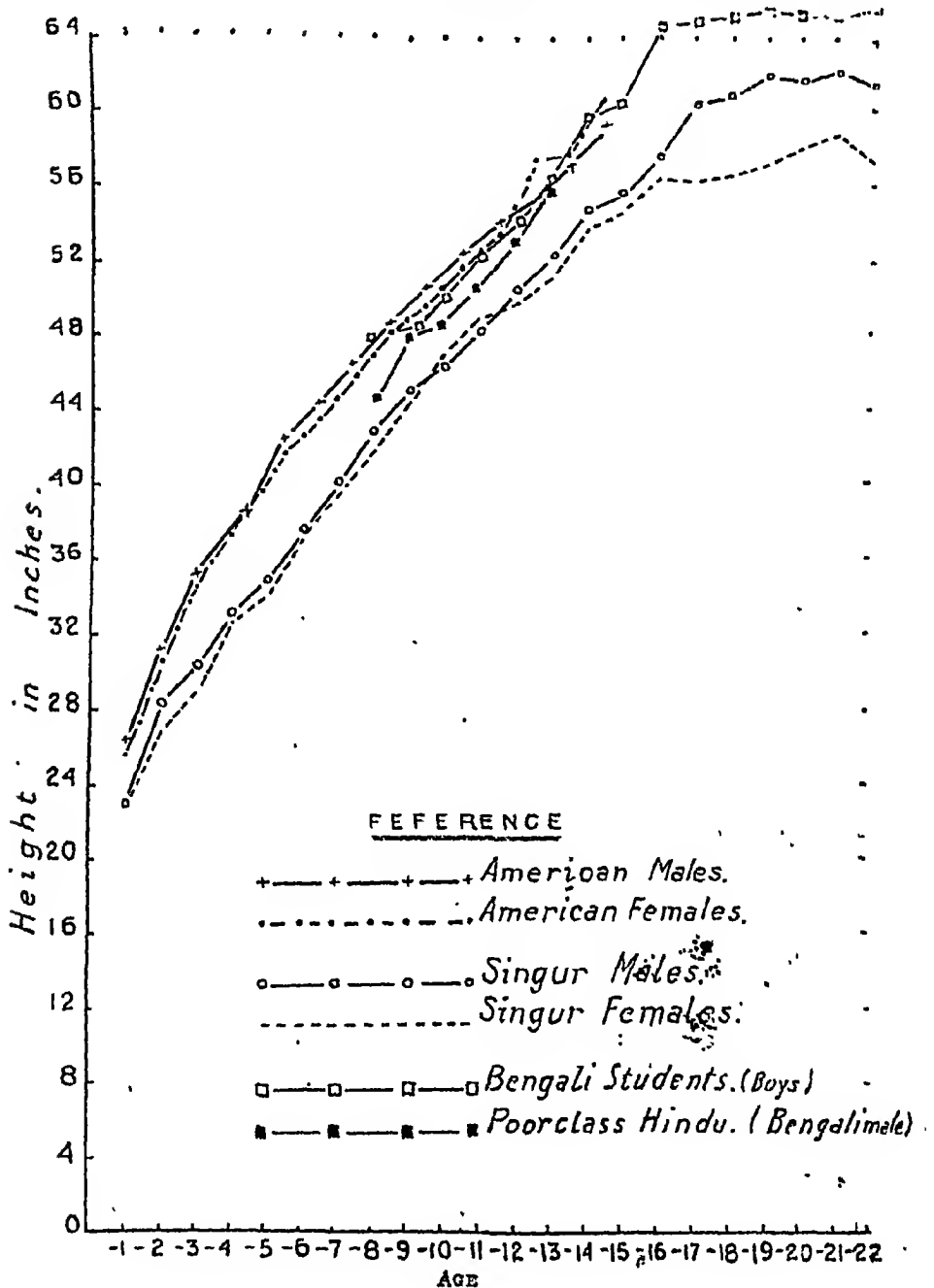






## CHART V.

AVERAGE HEIGHT FOR MALES & FEMALES ACCORDING TO AGE FOR VARIOUS POPULATIONS.





**CHART VI.**  
**AVERAGE NUMBER OF TERMINATED PREGNANCIES INCLUDING ABORTIONS FOR VARIOUS POPULATION GROUPINGS,**  
**SINGUR 1943.**

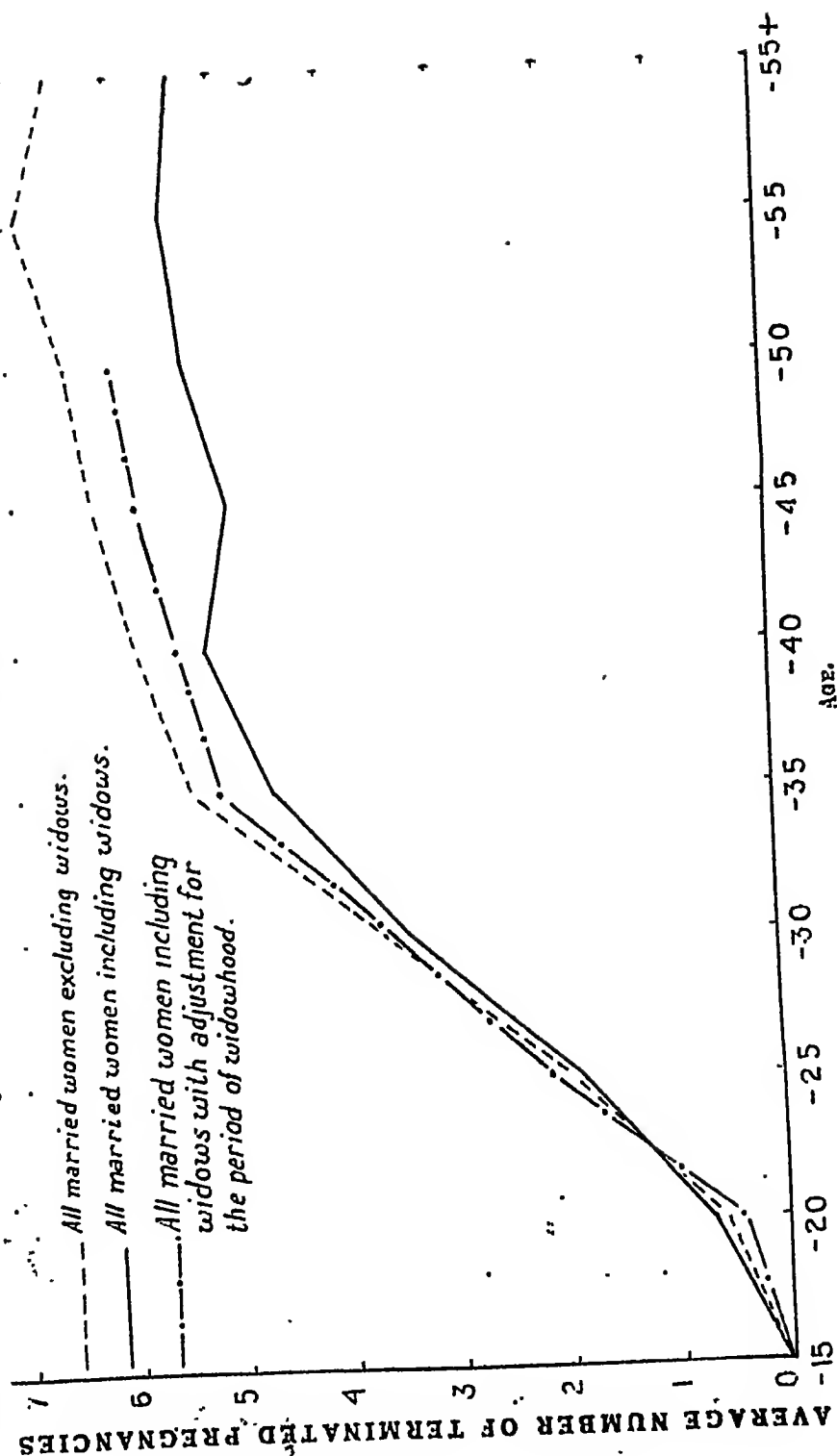
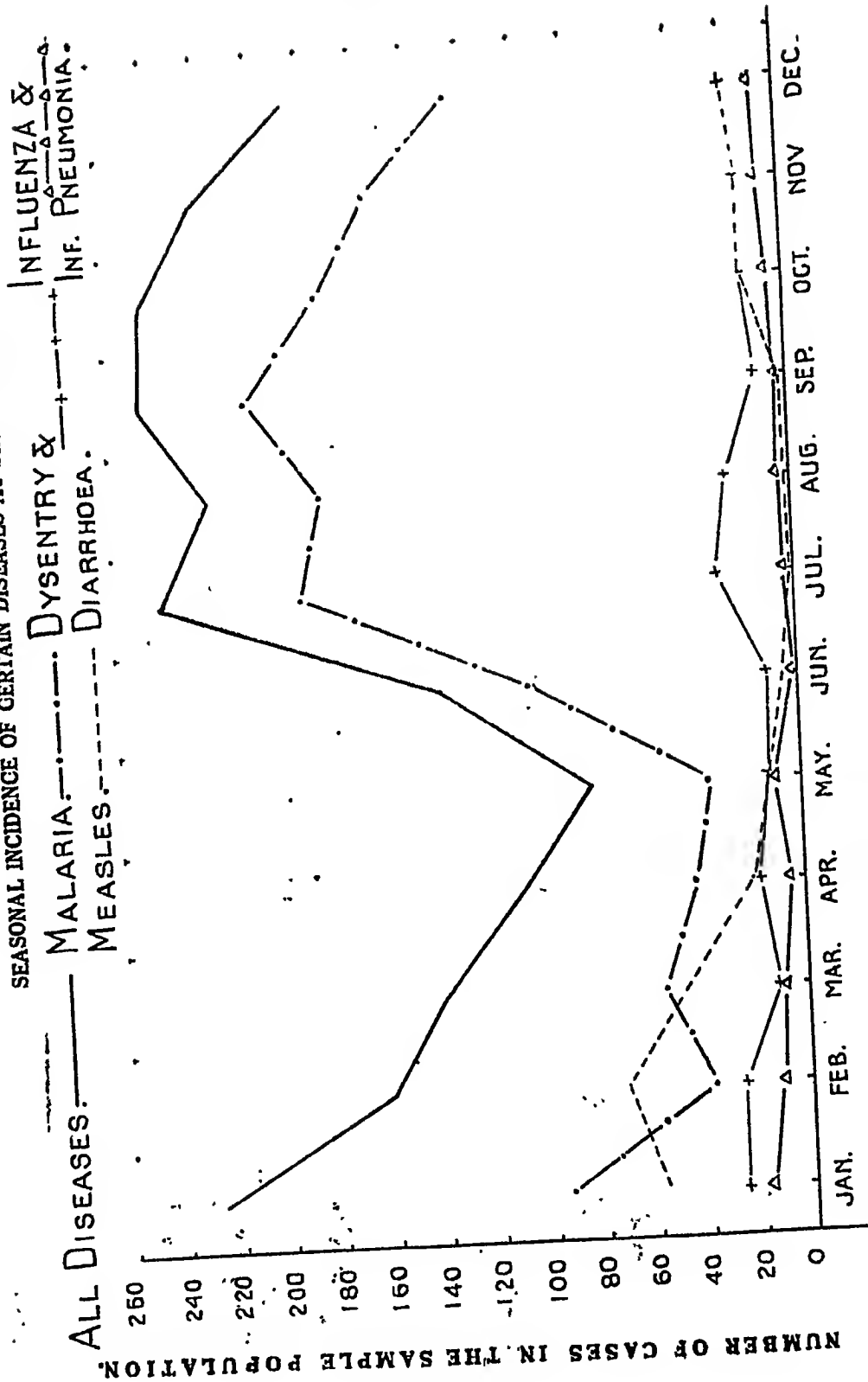


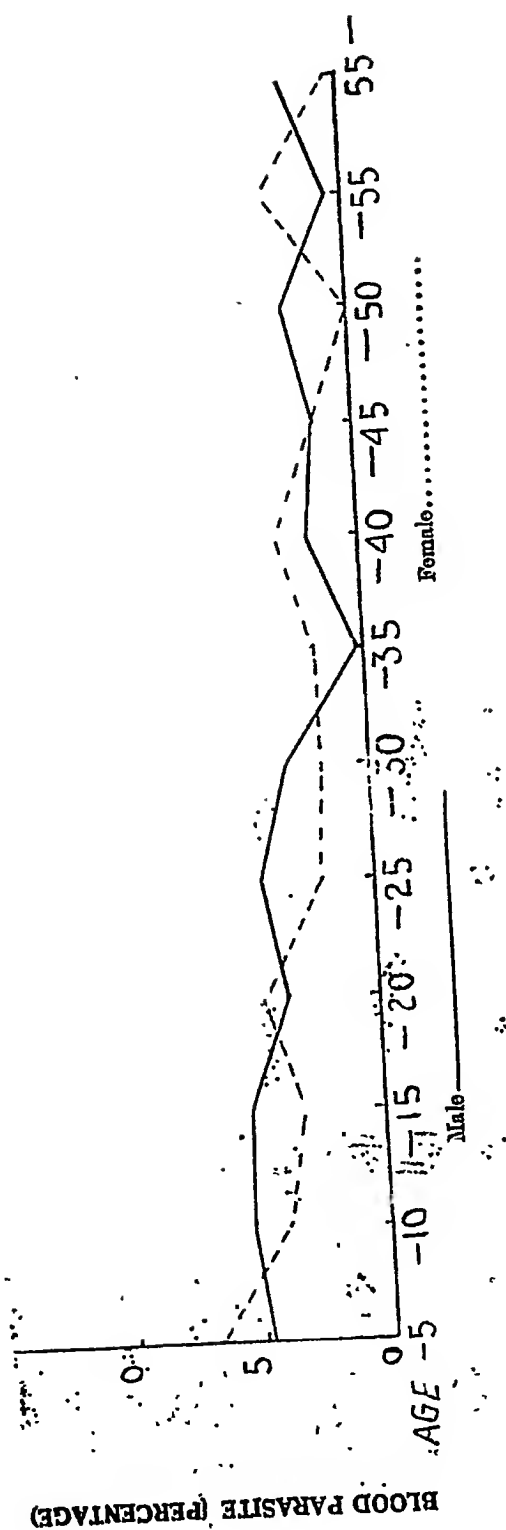


CHART VII.  
SEASONAL INCIDENCE OF CERTAIN DISEASES AT SINGUR 1943





**CHART VIII.**  
**CARRIERS OF BLOOD PARASITE ACCORDING TO AGE & SEX.**

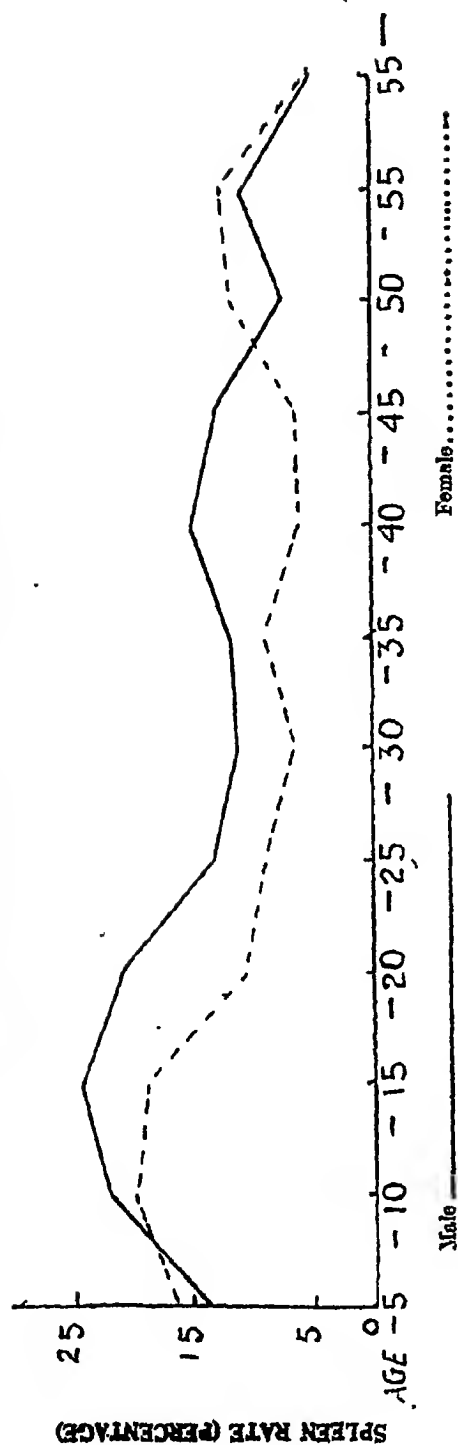






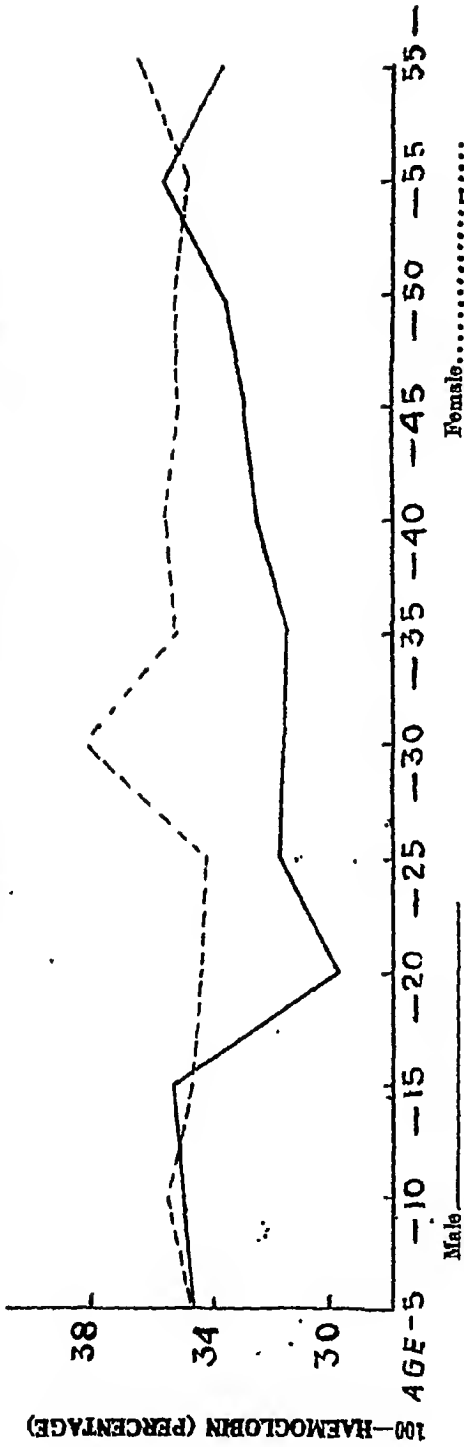
# CHART IX.

SPLEEN RATE (PERCENTAGE) ACCORDING TO AGE & SEX.





**CHART X.**  
**PERCENTAGE OF HAEMOGLOBIN DEFICIENCY ACCORDING TO AGE & SEX.**





**CHART XI.**  
**PERCENTAGE OF HOOKWORM CARRIERS ACCORDING TO AGE & SEX.**

